



Northern
Territory
Government

DEPARTMENT OF PLANNING AND INFRASTRUCTURE

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ABOUT THIS SPECIFICATION

This document was prepared by the Department of Planning and Infrastructure, and specifies the general standards of materials and workmanship required by the Department for small building works including services and landscape.

It applies to new work, restoration work and maintenance and may be used as a blanket reference document or combined with the Project Specific Requirements to identify particular items where a selection is offered in the reference text.

The text is based on NATSPEC, the national building specification produced by Construction Information Systems Australia Pty Ltd of which the Department of Planning and Infrastructure, is a stakeholder.

The referenced Australian Standards are current as of 1 April 2009 and this document is compatible with the Building Code of Australia, 2009. The annual publication date of this Standard Specification has been moved to April to align with the now yearly updates of NATSPEC and the BCA.

The text has been edited to specify only the type of construction common in the Northern Territory for small building works. For example brick construction is not specified and the Roofing Section is confined to sheet metal roofing. However, the text contains specific regional and policy requirements developed by Department of Planning and Infrastructure Officers with extensive experience in the construction industry in the Northern Territory.

This Standard Specification, now in its eleventh year of publication, supersedes the 2008 version. This edition will remain unaltered from April 2009 and an updated version will be published in April 2010.

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General Manager, Construction Division
10 March 2009

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Thanks to Wicking for providing
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enliven a rather mundane subject.



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DEPARTMENT OF
PLANNING AND INFRASTRUCTURE

STANDARD SPECIFICATION FOR SMALL BUILDING WORKS

REFERENCE TEXT 2009

REFERENCE: Read this Standard Specification in conjunction with the Project Specific Requirements and Drawings if any. Only those parts of the Standard Specification which refer to the works being carried out apply. This document may be used as a blanket reference specification referring generally to the standards of materials and workmanship required by the Department for small building works including services and landscape.

PROJECT SPECIFIC REQUIREMENTS:

The selection of specific items or materials for the works being carried out are specified in the Project Specific Requirements or shown as notes on the drawings.

OR

There are no separate project specific requirements in this specification. For specific items or materials for the works being carried out, refer to the drawings or extent of work if any.

PRECEDENCE: Any provision in the project specification or on the project drawings shall override any conflicting provision in the Standard Specification.

CONTRACT ADMINISTRATOR: If the revised Conditions of Contract are introduced into DPI, this will incorporate a change in title from Superintendent to Contract Administrator. When working within the new Conditions of Contract substitute the title 'Contract Administrator' in all cases where the Superintendent is referenced in this standard specification.

HOLD & WITNESS POINTS: These apply whether quality assurance is included in this project or not. Refer to the definitions of hold points and witness points in the general requirements section of this reference specification.

SITE COPY: Retain a copy of this document on site for the duration of the works.

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STANDARD SPECIFICATION

FOR SMALL BUILDING WORKS

REFERENCE TEXT 2009

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1. GENERAL REQUIREMENTS

1.1 GENERAL

Interpretation

Supply: Supply only - do not install.

Provide: Supply and install.

Required: Required by the contract documents or by the local council or statutory authorities.

Proprietary: Identifiable by naming the manufacturer, supplier, installer, trade name, brand name, catalogue or reference number.

Standards

Use referenced Australian or other standards (including amendments) which are current one month before the date of the contract except where other editions or amendments are required.

Manufacturer's or supplier's recommendations

Select, store, handle and install proprietary products or systems in accordance with the current published recommendations of the manufacturer or supplier.

1.2 DEFINITIONS

Witness Point

Give the superintendent sufficient written notice so that an inspection can be made.

Hold Point

Obtain the written approval of the superintendent for that particular stage of the works. Where work is to be covered or concealed do not proceed past that point until approval has been received.

Minimum notice

Minimum notice required so that inspections may be made: 24 hours in town areas, 3 days in other areas or 5 days in remote areas.

Proprietary Items

A similar alternative item having the required properties may be offered instead of the specified proprietary item for acceptance at the discretion of the Superintendent.

1.3 TERMITE PROTECTION

General

Standard: To AS 3660.1.

Chemical soil barriers - reticulation systems: Submit evidence that the system complies with AS 3660.1 Section 8 and the Building Code of Australia.

Tests- Soil barrier

Submit a registered testing laboratory analysis certificate of chemical soil barriers tested to Appendix E of AS 3660.1 if directed by the Superintendent.

1.4 TIMBER GENERALLY

Moisture content

General: Make milled products from timbers seasoned:

- To within 3% of the equilibrium moisture content

appropriate to the timber and its intended conditions of use.

- With no more than 3% difference between any 2 pieces in any one group.

Unseasoned timber

If unseasoned timber is provided, or variations in moisture content are likely, make allowance for shrinkage, swelling and differential movement.

Durability

General: Provide timbers with natural durability appropriate to the conditions of use, or preservative-treated timbers of equivalent durability.

Natural durability of Heartwood: to AS 5604.

Minimum requirements:

Class 1: Timbers in contact with the ground.

Class 2: Timbers above ground, not in continuous contact with moisture, well ventilated, protected from moisture but exposed to the weather.

Class 3: Timbers above ground, not in continuous contact with moisture, well ventilated, protected with a finish, and well maintained.

Class 4: Timbers fully protected from moisture, indoors, above ground, and well ventilated.

Preservative treatment

Standard: To AS 1604.

Hazard classification: To AS 1604.1 Table D1.

1.5 TESTS

Testing Authority

As defined in BCA 2008.

Carry out any testing required using an authority registered by the National Association of Testing Authorities (NATA) to test in the relevant field, except for tests to installed services.

1.6 COMPLETION

Warranties

Name the Principal as warrantee and give the Superintendent copies of manufacturers' warranties.

Instruction manuals

Give the Superintendent manufacturers' instruction manuals.

Cleaning

Remove rubbish and surplus material from the site and clean the work throughout.

Operation

Ensure moving parts operate safely and smoothly.

Termite barriers

Provide the Superintendent with a certificate of installation in accordance with AS 3660.1 Appendix A2.

Notice

Provide a durable termite barrier notice permanently fixed in a prominent location to BCA Volume 1 Part



B1.4 (i) and AS 3660.1 Appendix A. Generally fix to the inside of the door to the electricity meter box.

Surveyor's certificate

If requested by the Superintendent provide a certificate which confirms that the work, including boundary fences, has been correctly located.

Services layout

Give the Superintendent a plan which shows the location of underground services as installed. Use the same format as the contract drawings.

Authorities' approvals

Give the Superintendent evidence of approval of the statutory authorities whose requirements apply to the work.



2. SITE PREPARATION

2.1 GENERAL

Standard

Groundworks for slabs and footings: To AS 2870.

Interpretation

Rock: The Contractor shall be deemed to have allowed for the cost of performing the required excavations in whatever material may be encountered, and no extra payment shall be paid for excavation in rock.

Bad ground: Ground unsuitable for the work, including fill liable to subsidence, ground containing cavities, faults or fissures, ground contaminated by harmful substances and ground which is or becomes soft, wet or unstable.

Line of influence: A line extending downward and outward from the bottom edge of a footing, slab or pavement and defining the extent of foundation material having influence on the stability or support of the footings, slab or pavement.

Subgrade: The trimmed or prepared portion of the formation on which the pavement or slab is constructed.

Immediate notice

If rock or bad ground is encountered, advise the Superintendent immediately.

Explosives

Do not use explosives.

2.2 DEMOLITION

Standard

Demolition: To AS 2601.

Inspection - Witness Point

Witness Point: Give sufficient notice so that inspection may be made of adjoining structures before commencement of demolition.

Photographs

If required, photograph the areas adjoining the demolition work for future reference.

Demolished materials

Except for materials to be salvaged and retained by the Superintendent or re-used, take possession of demolished materials and remove them from the site. Do not burn or bury demolished materials on the site.

Recycling

Where possible, dismantle building components for off site recycling.

Hazardous materials - Witness Point

Witness Point: Give notice immediately if any hazardous materials or conditions are found.

Asbestos

Reference: Refer to the asbestos clause in the Conditions of Contract.

Dust protection

Provide dust-proof screens, bulkheads and covers to protect existing finishes and the immediate environment from dust and debris.

Adjacent property: Protect property either adjacent or on site from interference or damage by appropriate means.

Reinstatement: Make good any damage caused during demolition to match the existing.

Support

Provide temporary support for sections of existing buildings which are to be altered and which rely for support on work to be demolished.

Weather protection

If walls or roofs are opened for alterations and additions, or the surfaces of adjoining buildings are exposed, provide temporary covers to prevent water penetration.

Security

If walls or roofs are opened for alterations or additions, provide security against unauthorised entry.

2.3 TREE PROTECTION

Trees to be Retained: Refer to Drawings or as scheduled.

Marking

Mark trees which are required to be retained using suitable non-injurious, easily visible and removable means of identification. Remove the identification on completion.

**Protection**

Protect from damage trees which are required to remain. Do not remove topsoil from the area within the dripline of the trees and keep this area free of construction material and debris.

Excavation

If excavating near trees required to remain, use hand methods to locate, expose and cleanly remove the roots on the line of excavation.

Damage

If a tree, which is marked to remain, is damaged and repair work is considered impractical, or is attempted and fails, remove the tree and the root system, if so directed. Replace the tree with a tree of the same species and a similar condition and size or pay compensation.

Compensation for damage to existing vegetation shall be borne by the Contractor as a negative variation to the Contract and determined as follows:

Maximum valuation: \$2500 per tree

Minimum valuation: \$250 per tree

2.4 ENVIRONMENTAL PROTECTION**Erosion control**

Avoid erosion, contamination, and sedimentation of the site, surrounding areas, and drainage systems.

Dewatering

Keep the site free of water and prevent water flow over new work.

2.5 SITE CLEARING**Extent**

Limit clearing to areas to be occupied by construction, paving or landscape work.

Clearing operations

Remove everything on or above the site surface, including rubbish, scrap, grass, vegetable matter and organic debris, scrub, trees, timber, stumps, boulders and rubble. Remove grass to a depth just sufficient to include the root zone.

Mulching

Mulch all demolished aerial vegetation and reduce to pieces not larger than 75 X 50 X 15 mm and stockpile for reuse or remove from site.

Grubbing

Grub out or grind stumps and roots over 75 mm diameter to a minimum depth of 500 mm below subgrade under construction, and 300 mm below the finished surface in unpaved areas.

Removal of topsoil

General: Remove the topsoil layer of the natural ground which contains substantial organic matter over the areas to be occupied by construction and paving.

Maximum depth: 100 mm.

Topsoil stockpiles

Stockpile site topsoil required for re-use. Protect stockpiles from contamination by other excavated material, weeds and building debris.

Surplus material

Take possession of surplus material and remove it from the site.

2.6 EXCAVATION**Extent**

Excavate to give the levels and profiles required for construction, site services, paving, and landscaping. Allow for compaction or settlement.

Marking

Before commencing excavation, locate and mark existing underground services in the areas which will be affected by the groundworks operations including clearing, excavating and trenching.

Foundations

After excavation, confirm that the bearing capacity is adequate.

Bearing surfaces

Provide even plane bearing surfaces for loadbearing elements including footings. Step for level changes. Make the steps to the appropriate courses if supporting masonry.

Reinstatement

If excavation exceeds the required depth, or deteriorates, reinstate with fill to the correct depth, level and bearing value.

Grading

Grade the ground surface externally and to drain ground or surface water away from buildings without ponding.

2.7 SURFACE PREPARATION**General**

Before placing fill, ground slabs or load bearing elements, remove loose material, debris and organic matter and compact the ground to achieve the required density.

Source of fill

Provide fill free from organic matter, imported on to the site from an approved source unless the fill type can be provided from spoil recovered from the excavations or designated borrow pits.

Fill types

General fill: Inorganic material, maximum particle size 75 mm, plasticity index not exceeding 15%.

Select fill: Naturally occurring material, crushed or quarried stone, crushed gravel, or a mixture of crushed or quarried material free of lumps of clay and from organic or other deleterious material complying with the following requirements:



A.S. METRIC SIEVE	PERCENTAGE PASSING BY WEIGHT
75.0 mm	100
9.50 mm	30 - 100
2.36 mm	15 - 65
0.075 mm	5 - 25
Liquid Limit	Maximum 35%
Plasticity Index	Maximum 12%
Linear Shrinkage	
(Passing 04.25 mm)	6% Maximum
C.B.R. - 4 day soaked at 95% MMDD at 2.5 mm penetration	Minimum 40

Locations

Use select fill under concrete building slabs and paving and general fill in other areas.

Placing fill

Place fill in layers less than 200 mm and compact each layer to achieve the required density.

Maximum depth of sand fill: 400 mm.

Moisture content

If necessary to achieve the required density or moisture content, adjust the moisture content of the fill before compaction.

Required Density

Minimum density table

Location	Minimum dry density ratio (standard compaction) to AS 1289.5.1.1
Residential: Lot fill	90
Footings and non spanning slabs on ground areas of buildings	98
Embankments and paved areas: >0.15 m below subgrade surface <0.15 m below subgrade surface	90 95
All other areas: >0.3 m below finished surface <0.3 m below finished surface	90 95

Tests - Witness Point

Witness Point: Provide proof that the required compaction has been achieved.

2.8 SANDLAYER**Material**

Clean sharp sand free from deleterious material, well graded with at least 90% by weight passing the 4.75 mm sieve, and not more than 10% passing the 0.075 mm sieve.

Extent: Place a layer of sand to the area of the building under concrete slabs.

Nominal thickness: 50 mm.

Wet down before laying vapour barrier.

2.9 PILING**Bored piers**

After excavating bored piers, remove loose material and water from the base and confirm the bearing capacity. Do not allow loose material to fall down the hole before or during concreting; provide a liner if necessary.

Screw-in foundations

Provide a proprietary system designed to AS 2159.

2.10 SERVICE TRENCHES**Excavation**

If practicable, make trenches straight between personnel access ways, inspection points and junctions, with vertical sides and uniform grades.

Trench widths

Keep trench widths to the minimum consistent with the laying and bedding of the relevant service and construction of personnel access ways and pits.

Backfilling

General: Backfill service trenches as soon as possible after laying the service. Place backfill in layers. Compact each layer to a density sufficient to minimise settlement.

Backfill material: Excavated spoil or well graded inorganic material with maximum particle size of 75 mm.

- Next to services: Do not place any particles greater in size than 25 mm within 150 mm of services.
- Under paved areas: Coarse sand, controlled low strength material or fine crushed rock.
- In reactive clay sites classified M, M-D, H, H-D or E to AS 2870: Impervious material.





3. CONCRETE CONSTRUCTION

3.1 GENERAL

Cross reference

Refer to the *General Requirements* section for termite protection.

Standards

Concrete structures generally: To AS 3600 & AS 3610.

Plywood Formwork: To AS 6669.

Ground slabs and footings: To AS 2870 where appropriate.

Reinforcement: To AS/NZS 4671.

Deformed Ribbed Bar: Normal ductility class, strength grade 500 MPa, unless otherwise noted.

Round Bars: Normal ductility class, strength grade 250 MPa.

Reinforcing Mesh: Deformed ribbed, low ductility class, strength grade 500 MPa.

3.2 INSPECTION

Notice - Witness Point

Witness Point: Give sufficient notice so that inspection may be made at the following stages:

- Termite barrier and film underlay installed.
- Completed formwork, and reinforcement, cores and embedments fixed in place.
- Commencement of concrete placing.
- Before core filling masonry.

3.3 TESTS

Compressive strength – Hold Point

Sample, test, and assess: To AS 3600 and AS 1379.

Hold Point: Agree to the method of strength assessment prior to ordering concrete. Production assessment may be used if applicable and if the project is registered with the concrete producer for dissemination of production assessment statistics.

Other quality parameters

Sample, test and assess: To AS 1379 Section 5 using a NATA registered testing authority.

Slump: Test at least one sample from each batch before placing concrete from that batch in the work. Take the samples at the point of discharge on site.

Rejection: Remove rejected concrete from the site.

3.4 GROUND SLAB VAPOUR BARRIER

General

Provide a vapour barrier under slabs on ground including integral ground beams and footings.

Standard

Vapour barriers and damp proof membranes: To AS 2870.

Proprietary Item: Fortecon

Installation

Lay over the base, lap joints 200 mm and seal the

laps and penetrations with waterproof adhesive tape. Seal punctures and tears with waterproof tape before pouring concrete.

3.5 REINFORCEMENT

General

Provide reinforcement, including tie wires, plastic support chairs, spacers and accessories.

Identification: Supply reinforcement which is readily identifiable as to grade and origin.

Dowels

Round Bars, each dowel in one piece, straight, with square cut ends free from burrs. Apply two coats of bitumen emulsion to half the length of the dowel at one end. Embed the unpainted half of the dowels in the concrete placed first.

Minimum lap

Splice as follows:

- Mesh generally: 225 mm.
- Trench mesh: 500 mm.
- Bars: Greater of either 500 mm or 25 x bar diameter.
- Strip footing intersections and corners: For full width of intersecting reinforcement.

Minimum cover

Unprotected by membrane on ground or external surfaces: 40 mm.

Protected by membrane on ground: 30 mm.

Internal surfaces: 20 mm.

Footings: 50 mm

Aggressive soil or salty environment: 65 mm.

3.6 EMBEDDED ITEMS

Placing and fixing – Hold Point

Hold Point: Fix cores and embedded items to prevent movement during concrete placing. Obtain approval before cutting reinforcement or displacing reinforcement from its required location.

Tolerances on placement

Maximum deviation from correct positions:

- Embedded items generally: + 10 mm.
- Fasteners including, anchor bolts: + 3 mm.
- Anchor bolt groups for structural steel: To AS 4100 clause 15.3.1.

Corrosion protection

Galvanized ferrous fixings (other than stainless steel) to AS/NZS 4680 or AS 1214. Passivate galvanized surfaces to be embedded in concrete by dipping in 0.2% sodium dichromate solution.

3.7 CONCRETE

Pre mixed supply

Standard: To AS 1379, by the batch production process.

Maximum slump: 80 mm.



Concrete Grade

Footings - N25

Exposed slabs on ground - N32

Internal slabs on ground - N25

Columns & suspended slabs - N40

Other concrete grades may be required as shown on the drawings or in the Project Schedules.

Grout for blockwork cores

Standard: AS 3700 clause 10.7.

Grout: Class S12 (to AS 1379) 12 MPa with a pourable slump, a minimum cement content of 300 kg/m³ and maximum 6 mm aggregate.

Concrete placing

Depth: If concrete is deeper than 350 mm, place it in layers so that each succeeding layer is blended into the preceding one by the compaction process.

Slabs and pavements: Place concrete uniformly over the width of the slab so that the face is generally vertical and normal to the direction of placing.

Hot weather placing - Hold Point

The provisions of this clause apply to concreting where the surrounding shade outdoor temperature is greater than 32°C.

Hold Point: Mixing: Do not mix concrete when the outdoor shade temperature on the site exceeds 38°C, unless otherwise approved and then only subject to such conditions as may be imposed.

Handling: Take precautions to prevent premature stiffening of the fresh mix and to reduce water absorption and evaporation losses. Mix, transport, place and compact the concrete as rapidly as possible.

Placing

Before and during placing maintain the formwork and reinforcement at a temperature not greater than 32°C by protection, cold water spraying, or other effective means. When placed in the forms, the temperature of the concrete shall not exceed 35°C.

Temperature control methods: Submit for approval the proposed method or methods of maintaining the specified temperature of the placed concrete, which may include using chilled mixing water, spraying the coarse aggregate with cold water or covering the container transporting the concrete.

Evaporation Control: Erect barriers to protect freshly laid concrete from drying winds.

Compaction

Vibrate concrete to remove entrapped air, but avoid over-vibration that may cause segregation.

Curing:

Protection: Protect concrete from premature drying and from excessive hot, cold and/or windy conditions by a suitable approved method.

Minimum Curing Time:

- In-ground footings: 3 days.
- Exposed footings, beams and slabs: 7 days.

3.8 FORMWORK**Surface finish class**

Use the applicable class from AS 3610, Table 3.3.1.

Dimensional Tolerances

To AS 3600 clause 19.5, except where the requirements of this clause or AS 3610 clause 3.4 are more stringent.

Formwork removal

Remove all formwork, including formwork in concealed locations.

Stripping times

Leave formwork for suspended structures in place after pouring concrete for the following periods:

- Vertical surfaces: 2 days.
- Bottom surfaces: 7 days with shoring and backprops left in position for 21 days.

3.9 JOINTS**Construction joints**

Joint preparation: Roughen and clean the hardened concrete joint surface, remove loose or soft material, free water and foreign matter. Dampen the surface before placing the concrete.

Slip joints

If concrete slabs are supported on masonry, provide proprietary pre-lubricated slip joints.

Movement Joints

Insert 12mm thick Abelflex closed cell compressible filler strip in the joint.

Detach the removable top strip and fill with Fosroc Thioflex 600.

3.10 FINISHES TO UNFORMED SURFACES**Screeding**

Finish slab surfaces by approved means to finished levels. Produce surfaces to tolerance Class B - maximum deviation from a 3m straight edge of 6 mm.

Scored finish

After screeding, give the surface a coarse scored texture in the required direction by drawing a stiff brush or rake across the surface.

Machine floated finish

Finish the screeded surface with approved power driven equipment to a uniform smooth texture. Hand float in locations inaccessible to the machine float.

Finish: To a surface tolerance class A.

Steel trowelled finish

Use steel hand trowels to produce the final finish free of trowel marks and uniform in texture and appearance.

Finish: To a surface tolerance class A.

Wood float finish

Produce the final finish with a wood float.

**Sponge finish**

After screeding and finishing with a steel trowel obtain an even textured sand finish by wiping the surface with a damp sponge.

Broom finish

After floating use a broom to produce an even textured slip-resistant surface.

3.11 MISCELLANEOUS ITEMS

Concrete strength: 25 MPa.

Clothes hoist footing: 400 deep x 250 diameter with a 300 x 300 x 75 mm thick concrete surround above the finished ground line weathered away from the post.

Splash Pads: Provide 600 x 600 x 50 mm thick concrete splash pads at each downpipe to direct the water away from the building.

Mowing strips: Provide 300 wide x 75 thick concrete mowing strips where shown on the drawings. Fall away from building and construct tooled joints at 3 m maximum centres.

Gas cylinder pad: Provide 1000 x 500 x 100 mm thick concrete base slab where shown on the drawings or as directed.

Footpath Crossings: To local authority requirements.

**4. TIMBER AND STEEL CONSTRUCTION****4.1 GENERAL****Cross references**

Refer to the following sections:

- *General Requirements:* For termite protection and timber durability.
- *Concrete:* For installation of foundation bolts.
- *Tiling:* For waterproofing wet areas.
- *Cladding & Lining:* For timber trims.

Standards

Timber framing and flooring: To AS 1684 or AS 1720.1.

Structural steelwork: To AS 4100.

Steel framing: Provide a proprietary system designed to AS 3623.

Preparation of metal surfaces: To AS 1627.

Cold Formed Sections: To AS /NZS 4600

4.2 MATERIALS AND COMPONENTS**Cold-formed steel framing**

Cold-formed sections from zinc-coated steel or aluminium/zinc alloy coated steel to AS 1397/Z200 or AZ175.

Self-drilling screws

Standard: To AS 3566.2 corrosion resistance class 2.

Flashings and damp-proof courses

Standard: To AS/NZS 2904.

Timber fasteners

Metal washers: Provide washers to the heads and nuts of all bolts and coach screws.

Steel straps: Zinc-coated steel to AS 1397/Z275, minimum size 25 x 1 mm or 30 x 0.8 mm.

Galvanizing

Galvanize mild steel components (including fasteners) to AS 1214 or AS/NZS 4680, as appropriate, if exposed to weather; embedded in masonry; or in contact with chemically treated timber.

Electrogalvanizing

Ferrous hollow and open sections: To AS 4750.

4.3 STRUCTURAL STEEL**Inspection - Witness Point**

Witness Point: Give sufficient notice so that inspection may be made at the following stages:

- Commencement of shop fabrication.
- Surface preparation prior to painting.
- Steelwork and column bases erected on site, prior to grouting, encasing, site painting or cladding.

Shop drawings - Hold Point

Hold Point: Submit 2 complete sets of shop drawings showing the relevant details of each assembly, component, connection and details of transport and erection.

Materials**Grade****Steel Section**

Structural bars & sections to AS/NZS 3679.1	250
Steel plates to AS 3678	250
Hollow steel sections to AS 1163	250 or 350
Cold form sections to AS 1379	G450 Z350

4.4 CONSTRUCTION**Beam Camber**

If beam members have a natural camber within the straightness tolerance, fabricate and erect them with the camber up.

Foundation bolts

Hexagonal bolts: To AS 1111.1.

Hot-dip galvanized: To AS 1214.

Supply each foundation bolt with 2 nuts and 2 oversize washers and provide sufficient thread to permit the levelling nut to be set below the base plate.

Temporary connections - Hold Point

Hold Point: Do not attach cleats without approval. Remove temporary cleats on completion and restore the surface.

Enlargement of bolt holes - Hold Point

Hold Point: Do not hand flame cut or otherwise enlarge any bolt holes without approval.

Bolts

Use Grade 4.6/S bolts unless otherwise noted.

Welding

Standard: To AS/NZS 1554.1 use GP category welds unless otherwise noted.

Visually examine the total length of all GP welds.

Protective coating

Surface Preparation: To AS 1627.

Remove loose millscale, rust, oil, grease, dirt, globules of weld metal, weld slag and other foreign matter.

Priming: Apply the primer coat to the structural steel before delivery to the site and protect from damage during handling and transport.

Single pack zinc phosphate

Thoroughly wire brush steelwork to AS 1627.2 and prime with one coat of single pack zinc phosphate to APAS specification 0162/1 with a dry film thickness of 40 microns.

Epoxy zinc phosphate

Blast clean to the recommendations of AS 1627.4 to grade Sa of AS 1627.9 and prime with one coat of epoxy zinc phosphate to APAS specification 2971 with a dry film thickness of 45 microns.

Inorganic zinc silicate

Blast clean to recommendations of AS 1627.4 to grade Sa of AS 1627.9 and prime with one coat of inorganic zinc silicate to APAS specification 2908 with a dry film thickness of 75 microns.

Site work: After erection, repair any damage to the shop coating and apply the coating, if any, omitted at site connections.

Time delay: Prime the steel surface as soon as possible after surface preparation and prior to any deterioration of the surface. If the surface is contaminated or rust bloomed, repeat the surface preparation before applying the primer.

4.5 LIGHT STEEL FRAMING SYSTEM

Use the Lysaght framing system designed in accordance with Lysaght's design manual for steel wall framing in cyclonic areas or non-cyclonic as applicable.

Framing: Generally 75 x 1.6 G450 studs for cyclonic areas and 75 x 1.2 G300 studs for non-cyclonic areas externally at 450 max crs and 75 x 1.2 G300 studs internally with top and bottom plates, heads, mullions and bracing designed for the specific application.

Inspection - Witness Point

Witness Point: Give sufficient notice so that inspection may be made of steel framing erected on site prior to lining or cladding.

Fabrication

Cut members accurately to length so that they fit firmly against abutting members. Form holes by drilling or punching. Flare the holes for services or provide plastic grommets.

Weld the framing using the metal inert gas (MIG) technique or carbon arc welding. Clean the weld and coated areas affected by welding and touch up with zinc rich organic binder to APAS - 2916.

Cleaning: On completion of framing remove any debris from the cavities of members.

Temporary earthing: Provide temporary earthing during erection until the permanent earthing is installed. Permanent earth completed steel frames in accordance with PowerWater regulations.

Damp course: Provide a continuous damp proof course of Super Alcor between the concrete slab and floor plate.

Metal Roof Trusses – Hold Point

Approved manufacturer: Use metal roof trusses prefabricated by an approved manufacturer using Lysaght light steel framing sections.

Hold Point: Shop Drawings – Submit shop drawings showing the truss arrangement, location, loading, member sizes, joint details, lifting points and method of fixing and bracing.

Certification: Provide with the shop drawings certification of the structural sufficiency of the truss and roof design supplied on a completed NT Building Act Section 40 Certificate of Compliance form.

Steel battens

Roof Battens: Stratco 40 mm high cyclonic steel roof batten fixed to Deemed to Comply M/624/1.

Ceiling Battens: Rondo Part No. 303 cyclonic steel ceiling batten fixed to Deemed to Comply M/621/1.

4.6 TIMBER FRAMING**Identification**

Branding: Brand all structural timber, floor boards and structural plywood, under the authority of a recognised quality assurance program applicable to the product. Locate the brand mark on faces or edges to be concealed in the works. Provide a suppliers certificate showing compliance.

Inspection - Witness Point

Witness Point: Give sufficient notice so that erected structural woodwork may be inspected before it is covered, for example by cladding, lining and roofing.

Pressure treatment

Pressure treat all structural timbers with ACQ Preservative Formulation in accordance with



AS 1604.1 or alternatively with BFCA salts by the CSIRO approved dip-diffusion process. The minimum dry salt retention in permeable species is 5.6 kg/m³ to all timber with susceptible sapwood.

Timber grades

Hardwood: To AS 2796.1

Grading: To AS 2796.2

Structural Timbers: Generally F14 minimum.

Timber Trusses: To the truss manufacturers design.

Fasteners

Use fasteners capable of transmitting the loads imposed, and sufficient to ensure the rigidity of the assembly. Do not split or otherwise damage the timber.

Adhesives

Use adhesives capable of transmitting the loads imposed, and sufficient to ensure the rigidity of the assembly and that do not cause discolouration of finished surfaces.

Structural Adhesives: To AS/NZS 1328.1

Finished sizes

Use milled timbers with actual dimensions which are not less than stated dimensions, except for dimensions qualified by a term such as "nominal" or "out of" to which industry standards for finished sizes will apply. If unseasoned timber is used, or variations in moisture are likely, make allowance for shrinkage, swelling and differential movement.

Coating: Before placing bolts in contact with ACQ treated timber, coat the shank of the bolt in a grease or bituminous coating.

Structural plywood

Standard: To AS/NZS 2269.0

Bond: Type A.

Flooring: Tongued and grooved.

Veneer quality to visible surfaces: C (Minimum).

Structural sheet flooring

Installation: Fix 17 mm thick F14 Grade structural plywood flooring with elastomeric adhesive to AS 2329 in addition to nailing or screwing. Sand junctions lightly to a smooth, level surface.

Timber decking

Definition: Timber flooring with plain, bevel or pencil round edge suitable for pedestrian or light vehicle loadings in balconies, decks and access ways.

Timber (Minimum requirements): Hardwood species of durability Class 2, size 70 x 19 mm finished.

Installation: Lay in long lengths (minimum 3 spans) Stagger joints and make them over joists. Leave 4 mm between edges of boards.

Fixing: No 10 Countersunk head tek screws corrosion protection class 3. 2 No screws to each joist.

Surface finish: Apply the first coat all round before fixing.

Fibre cement flooring

Compressed sheets: To AS/NZS 2908.2, Type A, Category 4.

Thickness: Generally 15 mm.

Proprietary item: Hardies or CSR compressed sheet.

Installation: Lay the length of the sheets at right angles to the joists and continuous over at least 2 spans. Stagger the end joints and locate them centrally over joists. Butter the edges of sheets with adhesive and firmly butt join together. Provide expansion joints as recommended by the sheet manufacturer.

Fixing: Fix to joists with countersunk screws.

Wall framing

Gauging: Use gauged timbers in studs, noggings and plates for double faced walls.

Generally 100 x 50 studs at 450 max. crs.

Timber species or group: Hardwood. Minimum stress grade F14.

Provide additional support in the form of noggings, trimmers and studs for fixing lining, cladding, hardware, accessories, fixtures and fittings as required.

Damp-proof courses

Provide Super Alcor damp-proof courses under the bottom plate of stud walls built off slabs or masonry dwarf walls.

4.7 TIMBER ROOF TRUSSES**Approved manufacturer**

Use timber roof trusses prefabricated by an approved manufacturer.

Shop drawings - Hold Point

Hold Point: Submit shop drawings showing the truss arrangement, location, loading, timber species, grade and sizes, joint details, lifting points and method of fixing and bracing.

Marking: Permanently mark each truss to show the manufacturer, timber species, location, support points and other relevant data.

Certification: Provide with the shop drawings certification of the structural sufficiency of the truss and roof design supplied on a completed NT Building Act Section 40 Certificate of Compliance form.

Installation

Standard: To AS 4440.

Support trusses on bottom chord at two points only, unless designed for additional support. Plumb to within H/200, where H is the height at the apex. Provide the required ties and wind bracing. Over internal walls provide not less than 10 mm vertical clearance and use bracing methods which allow for vertical movements.



Fixing: Fix to the top plate with 50 x 5 mm mild steel over brackets with 1-M12 bolt to the truss top chord centre line and 1-M16 bolt to the structure.

4.8 MISCELLANEOUS ITEMS

Roof Battens: Generally 75 x 50 mm Hardwood.

Ceiling Battens: Generally 75 x 38 mm Hardwood.

Fixing: Fix in long lengths with joints at truss crossings and staggered. Double nail ceiling battens and fix roof battens to Deemed to Comply details.

Valley Boards: Fabricate from 19 mm exterior grade ply and nail to each rafter.



5. BLOCK CONSTRUCTION

5.1 GENERAL

Cross references

Refer to the following sections:

- *General requirements*, for termite protection.
- *Timber and steel construction*, for structural steelwork.

Standard

Masonry generally: To AS 3700.

Masonry units: To AS/NZS 4455.1 and AS/NZS 4455.3.

5.2 MATERIALS AND COMPONENTS

Steel components

Galvanizing: Galvanize mild steel components (including fasteners) to AS 1214 or AS/NZS 4680 as appropriate.

Masonry units

Strength: Generally 15 MPa for structural units.

Colour: Generally grey.

Flashings and damp-proof courses

Standard: To AS/NZS 2904.

Mortar materials

Cement: To AS 3972, Type GP.

Sand: Fine aggregate with a low clay content and free from efflorescing salts, selected for grading and colour for facework.

Additives: Do not provide additives unless required and approved.

Mortar mix table

Provide mortar mixes as follows: 1:1:6 cement, lime, sand for all general block work. Other mix proportions maybe required for special purposes.

5.3 CONSTRUCTION GENERALLY

Joints and cutting

Set out masonry with joints of uniform width and the minimum cutting of masonry units.

Joints

Externally: Tool to give a dense water-shedding finish. Use a 12 mm dia ironing rod.

Internally: Rake to give a key if wall is to be plastered or strike flush if concealed.

Rod

90 mm high blocks: 6 courses to 600 mm.

190 mm high blocks: 3 courses to 600 mm.

Bond

Stretcher bond unless otherwise noted.

Bedding

Shell bed hollow blocks and completely fill bed joints and perpend.

Perpends

Keep perpends in alternate courses vertically aligned.

Double face walls

Select the masonry units for uniform width and double-face qualities in single leaf masonry with facework both sides. Before commencement, obtain a ruling as to which is the preferred wall face, and favour that face should a compromise be unavoidable.

Colour mixing

In unpainted facework, distribute the colour range of units evenly to prevent colour concentrations.

Sills

Use proprietary concrete sill units solidly bedded.

Appearance

Leave unpainted facework clear of mortar smears, stains and discolouration. Do not clean using an acid solution and do not erode joints if using pressure spraying.

Wall Chasing

Chase concrete block walls to a maximum depth of 35 mm for 190 mm blockwork or 20 mm for 90 mm blockwork. Do not chase walls nominated as fire rated or acoustic.

Protection

Elements: Protect masonry from rain and hot drying winds for at least 24 hours after laying.

5.4 DAMP-PROOF COURSES

Location

Provide damp-proof courses to the base courses of external walls on raft slabs or as shown on the drawings.

Damp proof course: Use mortar with a black damp course admixture to manufacturer's instructions.

5.5 CONTROL OF MOVEMENT

Control joints for concrete Blockwork



Maximum length of continuous wall: 6 m.

Minimum width of control joint: 10 mm.

Flexible ties and anchors

If ties or anchors extend across control joints, provide ties or anchors which maintain the stability of the masonry without impairing the effectiveness of the joint.

Proprietary Item: Masonry flexible anchors MFA3/3 install at 400 crs max.

Joint material

Installation: Clean the joints thoroughly and insert a 19mm dia closed cell expanded polyethylene compressible backing rod before sealing.

Sealant depth: Fill the joints with gun-applied Thioseal 5000 single pack polysulphide flexible sealant for a depth of at least two-thirds the joint width.

Sealant Type: external, UV stable.

5.6 STEEL LINTELS

Cold-formed lintels

Proprietary cold-formed flat-based type designed to AS/NZS 4600.

Steel flats and angles

Sizes: To BCA Volume 2 Figure 3.3.3.5.

Material:

Mild steel galvanized to AS/NZS 4680.

Do not cut after galvanizing.

Corrosion protection: To AS/NZS 2699.3.

Installation

General: Install with the longer leg vertical. Keep lintels 10 mm clear of heads and frames. Pack mortar between the angle upstand and supported masonry units.

Propping: To prevent deflection or excessive rotation, temporarily prop proprietary cold-formed lintels until the masonry reaches its required strength.

Minimum propping period: 3 days.

5.7 REINFORCED MASONRY

Designation

Masonry required to be strengthened with embedded steel reinforcement (other than bed joint reinforcement) is designated reinforced masonry.

Cleaning core holes - Hold Point

Hold Point: In blockwork use purpose-made cleanout blocks or machine cut a cleaning hole at the base of each reinforced core, located on the side of the wall which is to be rendered or otherwise concealed. After cleaning out has been inspected and approved, cover the hole with formwork and grout the core.

Bond beams

Use bond beams made from purpose-made hollow concrete blocks with reinforcement grouted in place.

Install 6 mm fibre cement or proprietary metal closers at non reinforced cores of the wall below.

Reinforcement: As shown on the drawings.

Starter bars: Wire tie core reinforcement to starter bars.

Lintel blocks

Purpose made U shaped blocks with reinforcement grouted in place.

Clean out blocks – Witness Point

Location: At the base of each core to be grout filled including above bond beams and stage filled walls.

Hole size: Machine cut 100 x 100 mm.

Witness Point: Sealing: Following inspection of the core and reinforcement form over holes to contain core filling grout.

Core filling grout

Reference: Refer to the Concrete Construction section.

Structural blockwork: Fill core holes, bond beams and lintels etc. of structural blockwork with pre mixed grout.

Placing: Wait at least 3 days after construction of blockwork before placing grout. Limit the height of pours to 3 m. Grout fill all cores below ground level.



6. INSULATION AND SARKING

6.1 GENERAL

Interpretation

Sarking-type material: Flexible membrane material normally used for waterproofing, vapour retarding or thermal reflective insulation.

6.2 MATERIALS AND COMPONENTS

Bulk insulation

Cellulosic fibre: To AS/NZS 4859.1 Section 5.

Mineral blankets and cut pieces to AS/NZS 4859.1 Section 8.

Glass fibre in loose fill: To AS/NZS 4859.1.

Polystyrene: Moulded rigid cellular sheets: To AS1366.3.

Polystyrene: Extruded rigid cellular sheets: To AS 1366.4.

Wool: To AS/NZS 4859.1 Section 6.

Sarking membrane

Standard: To AS/NZS 4200.1.

Wire support to roof insulation

Use support mesh of 1.25 mm diameter galvanized wire welded in a grid of 100 x 115 mm.

Welded safety mesh to statutory requirements may also be used to support sarking.

Standard: To AS/NZS 4389.

Size: 300 x 150 grid of 2 mm diameter galvanized wire.

6.3 INSPECTION

Notice - Witness Point

Witness Point: Give sufficient notice so that the sarking, vapour barrier and insulation may be inspected before it is covered up or concealed.

6.4 INSTALLATION

Bulk insulation

Standard: To AS 3999 and BCA Clause J1.2.

Batts: Fit tightly between framing members. If support is not otherwise provided, secure nylon twine to the framing and stretch tight.

Insulation material: 75 mm thick fibreglass blankets or batts with a minimum R value of 2.0.

Bonding: Where required provide insulation blankets factory bonded to aluminium foil sarking material.

Sarking material

Standard: To AS/NZS 4200.2.

Proprietary Item: Bradford Thermofoil 753 (heavy weight).

Wall sarking

General: Provide sarking where shown on the drawings and behind cladding which does not provide a permanent weatherproof seal, including

- boards fixed vertically or diagonally;
- boards or planks fixed in exposed locations

where wind driven rain can penetrate the joints;

- unpainted or unsealed cladding.

Installation: Apply to the outer face of external stud walls from the top plate down over the bottom plate and flashing. Run across the studs and lap at least 150 mm at joints. At windows run over the head flashing.

Where the wall sarking also acts as vapour barrier. Lap and seal as for roof sarking to form a continuous air tight seal.

Roof sarking

General: Provide sarking to metal roofs as detailed on the drawings.

Installation: Lay the sarking to the whole of the roof area running parallel to the purlins or battens and lapped 150 mm over the purlins or battens.

Use support mesh to sarking on exposed roofs.

Ridge ventilation: Finish sarking at least 50 mm clear of ridges.

Combined Insulation and Sarking

Use a medium weight reflective foil factory bonded to a 75 thick fibreglass blanket with a minimum R value of 2.0.

Vapour Barrier

Requirement: Where the sarking also forms a vapour barrier seal the laps and penetrations with heat resistant pressure sensitive tape 75 mm wide to form a continuous air tight seal and seal to the walls with timber battens.

Ensure that the laps are mechanically fastened.





7. ROOFING

7.1 GENERAL

Cross reference

Refer to the *Insulation and Sarking* section for roof sarking requirements.

7.2 MATERIALS AND COMPONENTS

Roof material

Formed from G550 steel (or G300 for curving) with an AZ 150 Finish complying with AS 1397.

Protection: Protect the roof sheets from damage during handling and storage and prevent damage by moisture in stacked sheets.

Prepainted Steel

Prepainted steel sheet, factory finished with a polyester finish to AS/NZS 2728.

Flashing material

Use material with the same finish and from the same manufacturer as the roofing sheets.

Thickness: 0.55mm BMT steel sheet.

Fasteners

Self-drilling screws: To AS 3566.1, complete with washers and EDPM black, non conductive seals.

Corrosion resistance: To AS 3566.2.

- Tropical areas: Class 4
- Inland areas: Class 3

Exposed fasteners: Provide fasteners which are prefinished with an oven baked polymer coating to match the roofing material.

Fixings: Use only approved metal fixings.

Roof lights

Type: As scheduled or shown on the drawings and fitted in accordance with the Northern Territory Deemed to Comply standards.

7.3 INSPECTION

Notice - Witness Point

Witness Point: Give sufficient notice so that inspection may be made of the substructure before fixing the roof sheeting.

7.4 ROOF STRUCTURE

Alignment

Check and adjust the alignment of the roof structure before fixing any sheets.

Battens: 2 mm maximum mismatch at abutting ends.

Roof Plane: 5 mm per metre maximum deviation across the battens from a plane parallel to the specified roof slope.

7.5 METAL FASCIA & BARGE

Stratco 0.55 mm BMT prepainted steel 210 mm or 185 mm deep to suit the particular application.

Fixing: Fix to rafter ends with proprietary fixing clips in accordance with manufacturer's instructions.

Provide corner trims, end trims and cappings as required.

7.6 METAL ROOFING

Design and installation

Standard: To AS 1562.1.

Fixing: Fix the sheeting in accordance with the Northern Territory Deemed to Comply standards.

Visible accessories

Provide material with the same finish as roofing sheets.

Eaves

Treat ends of sheets as follows:

Generally: Close off ribs at tops and bottoms of sheets by mechanical means or with purpose-made end caps.

Turn ends of pans up at tops and down into gutters at bottoms by mechanical means.

Project sheets 50 mm into gutters.

Fit purpose-made ridge and eaves fillers of closed cell polythylene similar to Unisil.

Swarf

Remove swarf and other debris as soon as it is deposited.

7.7 ROOF PLUMBING

Selection and installation of rainwater goods

Standard: To AS/NZS 3500.3.

Sealing: Seal fasteners and mechanically fastened joints with silicone sealant.

Fixings: Use only approved metal fixings.

Flashings and cappings

General: Flash projections above or through the roof with two part flashings consisting of an apron flashing and an over-flashing, with at least 100 mm vertical overlap. Provide for independent movement between the roof and the projection. Continue over flashing to the roof ridge.

Wall abutments: Where a roof abuts a wall, provide overflashings as follows:

- Masonry or concrete: built into a 25 mm deep raking sawcut.
- Planked cladding: Stepped.

Pipe Penetrations: Seal with a neoprene coupling clamped to the pipe and fixed to the profile of the roof sheeting.

Proprietary Item: Dektite flashings by Deks-Thyer Pty Ltd.

Colour: To match the roof sheeting.

In Concrete or Masonry: Turn 25 mm into joints or grooves, wedge at 200 mm centres with compatible material and point up.

Gutters

Generally: Prefabricate gutters to the required shape where possible. Form stop ends, bends and returns. Turn down into outlets. Provide overflows to prevent back-flooding.



Minimum slope of eaves gutters: 1:200.

Eaves Gutters: High fronted square profile with overflow slots. Size 125 x 100 mm.

Material: Prepainted Steel 0.55 mm BMT.

Fixing: Fix to fascia with 40 mm x 1.0 mm galvanized brackets at 900 mm max. centres with overstraps.

Expansion Joints: Form expansion joints at max. 12 m centres by stop ending the gutter and saddle flashing over the two stop ends.

Valley Gutters: Profile to suit the valley boards. Turn back both edges 180° x 12 mm high. Screw to valley boards at the top to prevent creep.

Minimum overall width: 400 mm.

Box Gutters: Form to required falls with top edges level and returned 20 mm at 90°. T.I.G. Weld stop ends and outlets for downpipes and overflows. Fabricate rainwater sumps as detailed.

Material: 0.9 mm grade 304 stainless steel, 2b finish.

Downpipes

Material: 0.55 mm BMT Prepainted steel.

Prefabricate downpipes to the required section and shape with lock seams. Connect heads to gutter outlets and, if applicable, connect feet to rainwater drains. Fabricate joints, bends, offsets and provide accessories including supports and fittings as required.

Access Cover: Provide a removable watertight access cover at the foot of each downpipe stack.

PVC Downpipes: Use a proprietary system of bends, connections and fittings.



8. DOORS AND WINDOWS

8.1 GENERAL

Cross references

Refer to the following sections:

- *Lining*, for architraves.
- *Painting*, for priming of frames and doors before installation.

8.2 MATERIALS AND COMPONENTS

Flashings

Standard: To AS/NZS 2904.

Metal finishes

Zinc plating: To AS 1789, at least service condition number 2.

Anodising: To AS 1231, thickness; at least Grade AA20.

Thermoset powder coating: To AS 3715.

Glass

Selection and installation: To AS 1288.

Safety Glazing: To AS/NZS 2208.

Doorsets

Timber doors: To AS 2688 and NT Government designations N.T.I. to N.T.5.

Timber frames and jamb linings: To AS 2689.

Security screen doors and window grilles: To AS 5039.

Garage Doors: To AS/NZS 4505

Windows

Selection: To AS 2047.

Preglazing

If possible, preglaze doors and windows.

Bushfire Screens: To BCA table 3.7.4.1

8.3 CONSTRUCTION GENERALLY

Standards

Window installation: To AS 2047.

Security screen doors and window grilles installation: To AS 5040.

Flashings and weatherings

Install flashings, weather bars, drips, storm moulds, caulking and pointing so that water is prevented from penetrating the building between frames and the building structure.

Installation

Install doorsets and windows so they are plumb, level, straight and true; are adequately fixed or anchored to the building structure; and will not carry building loads, including loads caused by structural deflection or shortening.

8.4 STEEL DOOR FRAMES

Description

Use frames assembled from coated steel sections, including necessary accessories such as grommet type buffers, strike plates to suit the specified



hardware, spreaders, mortar guards, switch boxes, fixing ties or brackets, and cavity flashing with suitable provision for fixing hardware; prefinished with protective coatings, built in or fixed to prepared openings.

Sections

Incorporate rebates or double rebates where required for side hung doors or glazed transoms.

Coated steel sheet: To AS 1397.

Frame material: 1.2 mm thick zincanneal (Lysaght GZ-ZF100).

Assembly method

Welded: Shop assemble frames by continuous welding across mitred flanges. Grind welds smooth and cold galvanize the welded joints before shop priming with primer to APAS 2916.

Shop priming

Shop prime the sections for the painting system.

Fixing

Generally build in metal window and door frames in masonry as the work proceeds using proprietary galvanized fixing clips at 400 mm centres.

Packing: Pack behind fixing points with durable full width packing.

Linings

Provide reveal and jamb linings as necessary.

8.5 TIMBER DOORS

General

Proprietary doors manufactured for interior or exterior applications and for the finish required.

Flush Doors

Door thickness: Generally 35mm and 40mm for external doors and doors over 900mm wide.

Construction

Balanced construction, with cellular core and intermediate rails with additional material to take hardware and fastenings. Provide a minimum 25mm timber sub frame around openings for louvres or glazing. Do not make cut outs closer than the width of the styles. Provide bottom rails of sufficient thickness to allow trimming to clear carpet.

Solid core doors

Flush doors with blockboard cores and facings each side of no less than two sheets of timber veneer. MDF cores may be used in arid areas only.

Adhesives

Internal doors: To AS/NZS 2270

External doors: To AS/NZS 2271

Edge Strips

Fix hard wood edge strips to all edges to finish a minimum of 10mm thick.

Tolerance

Squareness: Not more than 3mm between lengths of diagonals.

Twist: Not more than 3mm between the perpendicular measurements from the diagonal corners.

Nominal size: Height: +0, -2mm

Width: +0, -2mm

Painting

Priming: Prime all areas subjected to paint removal during the course of fitting hinge housings, locks and the like, prior to hanging.

Painting: Within forty-eight hours of hanging and prior to the installation of door handles, weather excluders and the like (latches and locks excepted), undercoat all surfaces, followed by a minimum 1 finishing coat to all surfaces including top and bottom edges. The final coat may be applied at a later stage.

8.6 DOOR FURNITURE

Door Stops

Install door stops to prevent door furniture striking the wall or other surface.

Door Seals

Provide door seals to the bottom of all external doors. Proprietary Item: Raven RP4.

Hinge table

Provide 3 hinges for external doors and door leafs over 2040 mm in height or 820 mm in width. Otherwise provide 2 hinges as follows:

- 100 x 75 Lanes stainless steel hinges. Generally loose pin Cat No. 8580 or if required fixed pin cat No. 8588.
- For aluminium swing doors provide 3 No. stainless steel 102 x 42 interfold hinges - Doric SS DH18.

8.7 SLIDING INTERNAL DOORS

General

Suspend sliding doors from overhead tracks and wheel carriages appropriate to the size and mass of the doors.

Accessories

General: Provide overhead track supports and head and jamb linings appropriate to the arrangement of the door, and removable prefinished metal pelmets at the head to allow access to the wheel carriages for adjustment.

Wheel carriages: Fully adjustable precision ball race type providing smooth quiet operation.

8.8 SECURITY SCREEN DOORS

Use a proprietary system of extruded aluminium frames and infill of Amplimesh 103 or Crimsafe as required. Fix in accordance with AS 5040.

8.9 ROLLER SHUTTERS

Manual operation

Use a proprietary system comprising a flexible curtain sliding between vertical guides incorporating windlocks and operating mechanism of a hand pulled chain or for smaller units a spring balanced inertia movement.

Motorised operation

Provide a proprietary operator with a limit switch, manual safety stop and reversing mechanism, and overload cutout operated by a battery-powered radio remote controller and by a direct push-button or key switch. Locate operating switch 1.5 m above floor level.

8.10 LOCKSETS

External doors

Provide a push-button key and knob deadlock set to each door.

Security screen doors: Whitco double cylinder deadlock with internal snib.

Internal doors

Generally: Passage sets.

Bathrooms, showers and toilets: Privacy sets.

Sliding patio doors and windows: Provide key-lockable surface mounted bolts.

Door lockset mounting heights

To centreline of spindle: 1 m above finished floor.

Keying

Number of keys: Provide 2 keys for each lock.

Key external doors on domestic premises (excluding garage doors) alike and key windows alike.

8.11 WINDOWS

Design

Assemblies: Design the windows and external door assemblies, including glazing, framing and fixings in accordance with AS/NZS 1170.2, AS 4055, AS 1288, and AS 2047.

Pressures: Design the assemblies to be capable of resisting the most adverse combination of pressures as set out in AS/NZS 1170.2.

Suction: Design the assemblies to take into account the high local suction factors as given in AS/NZS 1170.2.

Human Impact: Design the assemblies to take into account the human impact requirements as given in AS 1288.

Frame Sections

Sections: The window frame sections shown on the drawings are indicative only to show the required relationships between openings and adjoining surfaces.

Shop Drawings - Hold Point

Hold Point: Submit shop drawings showing the layout and construction and fixing details a minimum of 14 days prior to ordering materials.

Certification

Provide a completed NT Building Act Section 40 Certificate of Compliance form, indicating that the entire assembly when installed as detailed, complies with the requirements of AS/NZS 1170, AS 1288 and AS 2047. State on the certificate the design criteria used, and that the installation is in accordance with the Contract Documents. Supply calculations if requested.

8.12 GLAZING

Glass Thickness: To AS 1288.

Glass Types:

- General Use: Clear Float Glass
- Tinted Glass: Grey Tinted Float Glass
- Safety Glass: Toughened or Laminated
- Obscure Glass: Satinlite
- Mirrors: Silvered Float Glass

Glazed Shower Screens: Use a proprietary system comprising extruded aluminium frames with a powder coat finish and fixed so that water sheds to the inside.

Mirrors: Seal the edges against moisture. In wet areas entirely seal the space behind the mirror.

8.13 CONSTRUCTION

Joints

Make accurately fitted tight joints so that neither fasteners nor fixing devices such as pins, screws, adhesives and pressure indentations are visible on exposed surfaces.

Insect Screens

Black anodised aluminium mesh beaded into an extruded aluminium frame and attached to the window by a clipping device to permit removal and finish to match the window frames.

Security Screens and Grilles

Standard: To AS 5039

Installation: To AS 5040

Security Screens

Proprietary stainless steel mesh in aluminium frames fixed to the building with tamper resistant fastenings and finished to match the window frames.

Proprietary Item: Crimsafe, Superscreen or Invis-gard.

Security Grilles

Proprietary metal security grille in aluminium frames fixed to the building with tamper resistant fastenings and finished to match the window frames.

Proprietary Item: Permaline Amplimesh 103.

Debris Screen

Proprietary Item: Permaline Amplimesh 351 debris screens in aluminium frames and finished to match the window frames.

Louvre Windows

Aluminium galleries with adjustable black plastic clips and dual operating mechanisms screw fixed to the mullions and jambs.



Louvre Blade width: 150 mm nominal.
Glass Louvre Blades: To AS 1288.
Metal Louvre Blades: Proprietary pre finished metal blades complying with the design requirements.

8.14 INSTALLATION

Install flashings and weatherings so that water is prevented from entering the building. Finish the installation with trims etc., to make neat, clean junctions at adjoining building surfaces.

8.15 COMPLETION

Remove temporary protection and ensure smooth and free operation of the assemblies.

9. CLADDING AND LINING

9.1 GENERAL

Cross references

Refer to the following sections:

- *Tiling*, for waterproofing of wet areas.
- *Insulation and Sarking*, for wall sarking requirements.
- *Timber and Steel Construction*, for compressed fibre cement flooring.

9.2 MATERIALS AND COMPONENTS

Flashing material

Standard: To AS/NZS 2904.

Sarking

Heavyweight reinforced aluminium foil complying with AS/NZS 4200.1.

Proprietary Item: Bradford Thermofoil 753 (heavy weight).

Fasteners

Steel nails: Hot-dip galvanized to AS/NZS 4680.

Self-drilling screws: To AS 3566, corrosion resistance class 4 in tropical areas and class 3 in inland areas.

Finish: Prefinish exposed fasteners with an oven baked polymer coating to match the cladding.

9.3 PLASTIC CLADDING

Standard

Unplasticised polyvinyl chloride (UPVC) sheet: To AS 4256.4.

Glass fibre reinforced polyester (GRP) sheet: To AS 4256.3.

Polycarbonate: To AS 4256.5.

Provide a proprietary system of interlocking planks including all accessories fixed in accordance with the manufacturers requirements and the Northern Territory Deemed to Comply standards.

Installation

Standard: To AS 1562.3.

9.4 FIBRE CEMENT CLADDING

Standard

General: To AS/NZS 2908.2, type A, category 3.

Plank cladding

Type: Provide a proprietary system of single faced fibre cement planks 7.5 mm thick.

Joints and edges: Metal joining clips and UPVC moulded trims to finish at door and window frames.

Corners: Preformed metal joining pieces.

Sheet cladding

Type: Provide single faced fibre cement sheets 6 mm thick.

Joints, corners and edges: UPVC extrusions or V butt joints. Use a Super Alcor backing strip behind vertical V butt joints and a Z section zincalume trim at horizontal joints.

Eaves & soffit lining

Type: Provide a proprietary system of single faced fibre cement sheets 6 mm thick.

Joints: UPVC extrusions or V butt joints.

Installation: Screw fix at 150 mm crs with proprietary self embedding head screws in accordance with the manufacturers instructions and the Northern Territory Deemed to Comply standards.

Screw Types

To metal 1mm to 1.6 mm thick: Blue Hornet self embedding head screws.

To timber and to metal under 1 mm thick: Streaker No. 8 x 20 mm self embedding head screws.

9.5 COMPRESSED FIBRE CEMENT CLADDING

Standard: To AS/NZS 2908.2, type A, category 5.

Cladding: 9 mm thick compressed fibre cement sheets.

Joints: Expressed joints - 10 mm gaps with EDPM gasket backing strips.

Fixing: Recessed countersunk screws in pre-drilled holes, filled with epoxy compound and sanded smooth in accordance with the manufacturers technical data.

9.6 METAL CLADDING

Cladding

Provide a proprietary system of prefinished profiled metal cladding complete with accessories, trim and flashings.

Fixing: Fix in accordance with the manufacturers instructions and the Northern Territory Deemed to Comply standards.

Penetrations: Flash all pipes and ducts, etc., passing through the cladding and trim with colour matched material to ensure weathertight joints.

Design and installation

Standard: To AS 1562.1.



Visible accessories

Provide materials with the same finish as cladding sheets.

9.7 LINING**Materials and components****Plasterboard**

Standard: To AS/NZS 2588.

Do not use plasterboard in wet areas.

Fibre cement

Standard: To AS/NZS 2908.2, type B, category 2.

Fasteners

Steel nails: Use corrosion resistant nails.

Self Drilling Screws: To AS 3566, corrosion resistance Class 2.

9.8 PLASTERBOARD**Installation**

Plasterboard: To AS/NZS 2589.

Framed construction: Screw or nail or combine with adhesive.

Masonry construction: Adhesive fix direct to masonry.

Joints

General: Provide recessed edge sheets and finish flush with perforated reinforcing tape.

External corner joints: Make over zinc-coated steel corner beads.

Control joints: Install purpose-made zinc-coated control joint beads in walls and ceilings at 12 m maximum centres and to coincide with structural movement joints.

9.9 FIBRE CEMENT SHEET

Installation: Screw fix with self embedding head screws and flush over screw heads.

Joints

Flush jointing: Use 6 mm thick Villaboard with recessed edges. Provide a flush finish using perforated reinforcing tape. In tiled areas do not apply a topping coat after bedding the perforated paper tape in bedding compound.

Control Joints: Install purpose made zinc coated control joint beads at max 7.2 m centres.

UPVC Joining Strips: Use 6 mm Versilux with proprietary UPVC mouldings at joints of sheets and edges.

V Joints: Use 6 mm Versilux with bevelled edges tightly butted to form neat V joints.

9.10 TONGUE AND GROOVE LINING**Installation**

Stained or clear finished boards: Select boards to give a random pattern. At corners, return the same board to give a continuous grain pattern.

Fixing: Nail twice to each crossing except for secret nailed profiles.

Nailheads: Treat visible nailheads as follows:

- In stained or clear finishes: Drive flush.
- In opaque finishes: Punch below surface and fill flush with putty after the surface has been primed.

Joints

End grain joints: Install boards so that butt joints are in compression.

Corners: Mitre external corners and scribe internal corners.

9.11 PLASTIC LAMINATE

3 mm thick plastic laminate sheet for use in wet areas. Adhesive fix the sheets and join with proprietary UPVC Joiners. Seal all joints.

9.12 TRIM**General**

Provide timber or moisture resistant medium density fibreboard trim, such as beads, skirtings, architraves, mouldings and stops, where necessary to make neat junctions between components, finishes and adjacent surfaces.

10. SUSPENDED CEILINGS**10.1 GENERAL**

Standard to AS/NZS 2785.

Performance Criteria

Technical Data: Provide technical data to substantiate compliance with the loading requirements including upward wind load.

Fixing:

Approved Fixers: Install the complete system and accessories using specialist fixers approved by the suspended ceiling manufacturer.

10.2 INSPECTION**Notice - Witness Point**

Witness Point: Give sufficient notice so that inspection may be made of the suspension system prior to installation of the panels or lining.

10.3 MATERIALS AND COMPONENTS

Zinc coated steel: To AS 1397/Z200.

Aluminium extrusions: To AS/NZS 1866.

Anodising: To AS 1231, not less than class AA10.

Thermoset powder coating: To AS 3715.

Plasterboard panels: To AS/NZS 2588.

Fibrous plaster tiles: To AS 2185 with hard cast plaster face.

Fasteners: Self-drilling screws: To AS 3566.

Powder activated fasteners: To AS/NZS 1873.4.



10.4 CONSTRUCTION GENERALLY

Ceiling grid – Hold Point

Set out the ceiling grid so that panel joints and centrelines of visible suspension members coincide with grid lines if shown on the drawings. If not otherwise shown, set out so that opposite margins are equal.

Hold Point: Obtain approval of the setout before commencing the installation.

Support members: Galvanized metal rods with a length adjustment of 50mm.

Installation: Install the ceilings level and fix so that there is no looseness or rattling of components or any of the faults described in Appendix B of AS/NZS 2785.

Bracing

Provide bracing where necessary to prevent lateral movement.

Fasteners

Use fasteners so that they are not visible in the finished ceiling.

Bulkheads

Construct bulkheads and other similar ceiling formations so that they are an integral part of the ceiling structure and comply with the ceiling performance requirements.

Panel installation

Painting: Paint ceiling tiles before erection.

Panel lock clips: Where panels are exposed to wind loads or where required for security, insert panel lock clips at the junction of carrier rails and panels.

10.5 ACCESSORIES AND TRIM

General

Provide accessories and trim necessary to complete the installation.

Control Joints

Provide control joints in sheet finishes where required.

Service penetrations

Provide openings for, and fit the ceiling system up to, services elements such as light fittings, ventilation outlets, detectors, sprinklers and loudspeakers.

Access Panels

Provide flush fitting access panels in non-demountable ceilings supported and anchored by methods which permit ready removal and refixing.

Number: One per 10 m² or where shown on the drawings.



11. PLASTERING

11.1 GENERAL

Cross references

Refer to the following sections:

- *Tiling*, for waterproofing of wet areas.
- *Painting*, for priming of embedded steel.

11.2 MATERIALS AND COMPONENTS

Plaster materials

Sand: Fine aggregate with a low clay content, selected for grading and complying with SAA HB161.

Cement: To AS 3972, type GP.

Lime: To AS 1672.1.

Sand: Fine, sharp, well graded with low clay content and free from efflorescent salts.

Gypsum plaster: To comply with the recommendations SAA HB 161.

Metal lath: Expanded metal to AS 1397/Z275.

Lime putty mixes

Make a coarse mix of lime putty and sand 16 hours before use and do not allow to dry out.

Gauged mixes

To improve workability, mixes required to contain only cement and sand may be gauged by the addition of lime up to 25% of the cement content, but not as a substitute for the cement.

11.3 SUBSTRATE

Correction of substrate

Before plastering, make good defects in the substrate. Hack off excessive projections. Fill voids and hollows with a mix not stronger than the substrate nor weaker than the first coat.

Absorbent Surfaces: If suction is excessive control by dampening but avoid over wetting.

Painted Surfaces: Remove paint and hack the surface at close intervals.

Untrue substrate

If one coat application is required, but the substrate is not sufficiently true to comply with the thickness limits for one coat, or has excessively uneven suction resulting from variations in the composition of the substrate, apply 2 coats.

Cleaning

Remove loose material and leave the surface clean and dust free.

Embedded items

Sheath water pipes and other embedded items to permit thermal movement. If ungalvanized steel items are to be embedded in plaster, prime before fixing.

Chases

If chases or recesses are more than 50 mm wide, cover with metal lath extending at least 75 mm beyond each side of the recess.



Metal backgrounds

Fix metal lath to provide a key for plaster. Press the plaster through the apertures of the metal lath.

Dense concrete backgrounds

Provide a mechanical key by hacking, bush hammering or abrasive blasting to expose the aggregate then dash coat.

11.4 PLASTERING**Thickness limits**

One coat work: 12 - 15 mm.

Multi-coat work:

- First coat: 9 - 15 mm.
- Setting coat: 2 - 3 mm.

Cement rendering

Proportions by volume (cement:lime:sand) for concrete and dense concrete block: 4:1:16

White-set plaster

Use 3:1 gypsum plaster : lime putty, applied as a skim coat direct to the substrate.

Waterproof render

Use cement based render with proprietary waterproofing admixture.

Tolerances

Finish plane surfaces within a tolerance of 6 mm in 3 m, determined using a 3 m straight edge placed anywhere in any direction. Finish corners, angles, edges and curved surfaces within equivalent tolerances.

Curing

Do not allow rapid or uneven drying out.

Keep continuously moist for 2 days and allow to dry for 5 days before applying further plaster coats.

V-joints

Provide V-joints cut straight through the plaster to the substrate at the following locations:

- Junctions between different substrate materials.
- Abutments with other finishes.
- Abutments with metal door frames.

Trim

Provide purpose-made zinc-coated steel sections as corner beads, stop beads, and at movement control joints.

Finishes

Sand finish generally for cement render.

Steel trowel finish for white set and cement render to be vinyl sheeted.

Wood float finish for cement render to be tiled.

Movement joints

Provide movement joints 3 to 6 mm wide in the finish to coincide with movement joints in the substrate. Finish with Rondo stopping beads and fill with a resilient sealant.

**12. JOINERY AND FIXTURES****12.1 GENERAL**

Outline description

This section covers:

- Joinery & Associated Hardware
- Fire Extinguishers & Blankets
- Pin Boards & White Boards etc.,
- Clothes Hoists, Letter Boxes etc.

Cross references

- *Painting*: For paint finishes.

12.2 MATERIALS AND COMPONENTS**Plywood**

Interior use generally: To AS/NZS 2270.

Interior use, exposed to moisture: To AS/NZS 2271

Particleboard

Standard: To AS/NZS 1859.1.

Medium density fibreboard

Use fine grained uniform density resin-bonded board.

Standard: To AS/NZS 1859.2.

Moisture resistant medium density fibreboard: Designated by the manufacturer as having improved moisture resistance and marked as such.

Melamine overlaid medium density fibreboard: Medium density fibreboard overlaid on both sides with low pressure melamine.

Wet Processed Fibreboard

Standard: To AS/NZS 1859.4.

Moisture content

Make milled products from timbers seasoned to within 3% of the equilibrium moisture content appropriate to the timber and its intended conditions of use; and with no more than 3% difference between any 2 pieces in any one group.

Finished sizes

Provide milled timbers with actual dimensions which are at least the required dimensions, except for dimensions qualified by a term such as "nominal" or "out of" to which industry standards for finished sizes apply.

Decorative overlaid wood panels

Standard: To AS/NZS 1859.3.

High pressure decorative laminated sheet

Standard: To AS/NZS 2924.1.

**Decorative laminated sheet application table**

Provide classes as follows in either standard type or type P for posting forming as applicable:

Class to AS/NZS 2924.1	Application
HGS or HGP	Kitchenwork-tops
VGS	Kitchen front panels
VLS	Other locations

Thickness

When fixed to a continuous background

- Horizontal surfaces: 1.2 mm
- Vertical surfaces: 0.8 mm
- Post formed laminate: 0.8 mm
- Edge strips: 0.4 mm
- Vertical fixing to studs etc: 3.0 mm

12.3 CONSTRUCTION GENERALLY**General**

Construction: Build components square and install plumb.

Joints: Provide materials in single lengths whenever possible. If joints are necessary, make them over supports.

Fasteners and adhesives

General: Provide fasteners, adhesives or both to transmit the loads imposed and ensure the rigidity of the assembly. Do not split, discolour or otherwise damage timber or sheets.

Visibility: Do not provide visible fixings except in the following locations:

- Inside cupboards and drawer units.
- Inside open units, in which case provide proprietary caps to conceal fixings.

Finishing

Junctions with structure: Scribe plinths, benchtops, splashbacks, ends of cupboards, kickboards and returns to follow the line of floors or walls.

Edge Strips: Finish all exposed edges of sheets with edge strips that match the sheet faces.

12.4 CUPBOARD AND DRAWER UNITS**Plinths**

Generally: 16 mm melamine overlaid high moisture resistant medium density fibreboard.

Wet Areas: Ex 25 Thick Hardwood

Height: 90 mm

Fabrication: Form up with front and back members and full height cross members at 900 max. centres.

Finish: Plastic laminate or painted.

Carcasses, drawer fronts, shelves and doors

Material: Melamine overlaid high moisture resistant medium density fibreboard.

Minimum thickness: 16 mm.

Finish: Provide decorative laminated sheet if necessary to conceal fasteners or to provide selected colours.

Installation: Secure plinths and carcasses to floors, walls, or both at not more than 600 mm centres.

Drawer fronts: Rout for drawer bottoms.

Adjustable shelves: Support on proprietary pins in holes bored at 32 mm centres vertically.

Drawer and door hardware

Hinges: Provide concealed all-metal hinges with the following features:

- Adjustable for height, side and depth location of door.
- Self closing action.
- Hold open function.
- Nickel plated.

Proprietary item: Blum 170° opening.

If required use Machined brass butts.

Door leaves up to 760 mm high - 2 no. 64 mm.

Door leaves over 760 mm high - 3 no. 75 mm.

Drawer Slides: Provide metal runners and plastic rollers with the following features:

- 30 kg loading capacity.
- Closure retention.
- White thermoset powder coating or nickel plated.

Proprietary Item: Blum BS220 m with length to suit the drawer size.

Cupboard Locks: Lockwood 690 pin tumbler cupboard locks.

Cupboard Handles: 100 mm x 10 mm diameter stainless steel 'D' pulls - Satin Finish.

12.5 BENCHTOPS**Laminated benchtops**

Material: Moisture resistant medium density fibreboard.

Minimum thickness: 32 mm.

Finish: Decorative laminated sheet adhesive fixed.

Sealing underside: Laminate undersides of benchtops if likely to be subject to excessive moisture from equipment such as dishwashers; or the benchtop is not restrained against warping by cupboard carcass or support framing.

Installation: Fix to carcass at least twice per 600 mm length of benchtop.

Joint sealing: Fill joints with a sealant matching the finish colour and clamp with proprietary mechanical connectors.

Edge sealing: Seal to walls and carcasses with a sealant which matches the finish colour.

12.6 CEILING ACCESS**Ceiling**

Trim openings and provide hinged access panels of size 600 x 600 mm. Hold shut with two 75 mm satin chrome plated barrel bolts.

12.7 FIRE FIGHTING**Portable extinguishers**

Provide portable fire extinguishers and location



signs in accordance with the general requirements of AS/NZS 1841.1.

Fire blankets

Provide fire blankets and location signs to AS/NZS 3504 - size: 1800 x 1800 mm.

12.8 DISPLAY BOARDS

White boards

White Viterous enamel steel sheet on 13 mm plasterboard with aluminium foil backing fixed in a clear anodised aluminium frame with a black neoprene strip to conceal fixings and an integral pen rail. Conceal screw fix to wall at 900 maximum crs.

Pin boards

Homogenous, resilient, hessian backed cork 3.2 mm thick on 13 mm plasterboard with aluminium foil backing fixed in a clear anodised aluminium frame with a black neoprene strip to conceal fixings. Screw fix to wall at 900 maximum crs.

12.9 CLOTHES HOISTS

Supply clothes hoists as required in the positions indicated or as directed.

Rotary Hoists - Hills Supa 4 rotary clothes hoist.

Folding Hoist - Hills paraline duo FD40362.

Install as per the manufacturers written instructions.

Concrete Footings: refer to the miscellaneous items clause in the Concrete Construction section.

12.10 GRAB RAILS

Polished stainless steel 32 mm diameter with concealed fixings.

Design and fixing: To AS 1428.1.

12.11 LETTERBOXES

Supply mailboxes complying with AS/NZS 4253.

Provide locks where required.

Install on the fence with galvanized brackets or mount on 40 N.B. galvanized pipe 1000 mm above ground level in a concrete footing 300 dia x 600 mm deep.



13. TILING

13.1 GENERAL

Standards

Follow the guidance given in AS/NZS 3958.1 and AS/NZS 3958.2.

13.2 MATERIALS AND COMPONENTS

Exposed edges

If available, provide purpose-made border tiles with the exposed edge (whether round, square or cushion) glazed to match the tile face.

Accessories

If available, provide tile accessories such as round edge ceramic tiles, cove tiles, step treads and nosings to stairs, landings, and thresholds, skirtings, sills, copings and bath vents, which match the surrounding tiles, composition, colour and finish.

Adhesives

Standard: To AS 2358.

PVA based adhesives: Do not use in wet areas or externally.

Mortar materials

Sand: Fine aggregate with a low clay content selected for grading, sharp and free from efflorescing salts.

Cement: To AS 3972, type GP.

Bedding mortar

Proportioning: Select proportions from the range 1:3 to 1:4 cement:sand by volume to obtain satisfactory adhesion. Provide minimum water.

Grout

Cement based proprietary grout: Mix with water.

Fine sand may be added as a filler in wider joints.

Portland cement based grout: Mix with fine sand.

Provide minimum water consistent with workability.

Proportioning:

- For joints up to 3 mm: 1:2 cement:sand.
- For joints over 3 mm: 1:3 cement:sand.

Epoxy Grout: Use a proprietary epoxy grout in commercial kitchens and other heavy duty applications.

Terracotta Tiles: Use proprietary polymer modified grout.

Substrates

General: Before tiling, allow at least the following times to elapse (for initial drying out and shrinkage) for these substrates:

- Concrete slabs: 42 days.
- Concrete blockwork: 28 days.
- Toppings on slabs and rendering on brick or blockwork: A further 21 days.

Substrate Preparation

General: Ensure substrates are as follows:

- Clean and free of any deposit or finish which may impair adhesion or location of tiles.
- Compatible with all components of the floor system.



Absorbent substrates: If suction is excessive, control it by dampening but avoid over-wetting and do not apply mortar bedding to substrates showing surface moisture.

Dense concrete: If not sufficiently rough to provide a mechanical key, roughen by scabbling or the like to remove 3 mm of the surface and expose the aggregate; then apply a bonding treatment.

13.3 INSPECTION

Notice - Witness Point

Witness Point: Give sufficient notice so that an inspection may be made at the following stages:

- Completion of waterproof membrane.
- Initial or trial set out.

13.4 SAMPLES

General

If required submit labelled samples of tiles, including fittings, accessories, grout and sealants, illustrating the range of variation in colour and finish.

13.5 WATERPROOFING WET AREAS

Standard

General: To AS 3740.

Membrane: To AS/NZS 4858.

Membrane

Provide a proprietary (non acrylic) liquid applied or sheet membrane system for use in wet areas, shower recess bases and associated floors and wall to floor junctions which are to be tiled.

Proprietary Item: Bostik Dampfix 2.

Installation

Floor wastes: Turn membrane down into the floor waste puddle flanges, and adhere.

Hobs: Extend membrane over the hob and into the room at least 50 mm. For hobless showers extend 1800 mm into the room.

External tiling: Provide a waterproof membrane under external floor tiling, to balconies and over habitable rooms, which forms a drained tank suitable for continuous immersion. Do not run under bounding walls.

Curing: Allow membrane to cure fully before tiling.

13.6 TILING

Cutting

Cut tiles neatly to fit around fixtures and fittings, and at margins where necessary. Drill holes without damaging tile faces. Rub edges smooth without chipping.

Laying

Return tiles into sills, reveals and openings. Butt up to returns, frames, fittings, and other finishes.

Variations

Distribute variations in hue, colour, or pattern uniformly, by mixing tiles or tile batches before laying.

Protection

Keep traffic off floors until the bedding has set and attained its working strength.

Setting out

General: Set out tiles to give uniform joint widths within the following limits:

- Internal ceramic tiling: 1.5 - 3 mm.
- Mosaic tiling: As dictated by pattern.
- Quarry tiles: 6 - 12 mm.
- Vitrified floor tiles: 3 - 5 mm.
- Stone tiles: 1.5 - 3 mm.

Joint alignment: Set out tiling with joints accurately aligned in both directions and wall tiling joints level and plumb.

Joint position: Set out tiles from the centre of the floor or wall to be tiled and if possible, ensure cut tiles are a half tile or larger.

Fixtures: If possible, position tiles so that holes for fixtures and other penetrations occur at the intersection of horizontal and vertical joints or in the centre of tiles.

Falls and levels

General: Grade floor tiling to even and correct falls generally, and to floor wastes and elsewhere as required. Make level junctions with walls. If falls are not required, lay level.

Minimum fall generally: 1:100.

Minimum fall in shower areas: 1:60.

Change of finish: Maintain finished floor level across changes of floor finish including carpet.

Preparation of tiles

Adhesive bedding: Fix tiles dry.

Mortar bedding: Soak porous tiles in water for half an hour and then drain until the surface water has disappeared.

Terracotta Tiles: Use presealed tiles or apply a breathable sealer.

Floor finish dividers

Finish tiled floors at junctions with differing floor finishes with a corrosion-resistant metal dividing strip fixed to the substrate. If changes of floor finish occur at doorways, make the junction directly below the closed door.

Bath ventilation

Ventilate the space below fully enclosed baths with at least 2 ventilating tiles.

Sealed joints

Fill joints with silicone sealant and finish flush with the tile surface where tiling joins sanitary fixtures and at corners of walls in showers.

Proprietary Item: ABA Colourflex silicone sealant to match the colour of the grout..

Movement joints

Provide movement joints over structural joints and at walls or to divide tiled areas into bays a maximum of 20 m² and 5 m wide. Provide joints 6 to 12 mm wide to suit the tiling pattern and fill with a colour matching silicone sealant over a foam backing rod.



14. PAINTING

14.1 GENERAL

Standards

Follow the guidance given in AS/NZS 2311 and AS/NZS 2312.

Powder Coating

Aluminium surfaces: To AS 3715.

Steel or zinc coated surfaces: To AS 4506.

'Wet Paint' warning

Place notices conspicuously and do not remove them until the paint is dry.

14.2 MATERIALS AND COMPONENTS

Premium Paints

Use only premium paints from approved manufacturers.

Paint Manufacturer

Prior to placing orders provide a list showing the brand of the paint proposed for use and the trade names of the paint types referred to by generic type and APAS specification number in the painting schedule.

Spray Painting - Hold point.

Do not apply by spray without approval.

Combinations

Do not combine paints from different manufacturers in a paint system.

Delivery

Deliver paints to the site in the manufacturers' labelled containers. Ensure containers are marked with the APAS (Australian Paint Approvals Scheme) specification number.

14.3 INSPECTION

Notice - Witness Point

Witness Point: Give sufficient notice so that each of the following stages may be inspected:

- substrate immediately prior to commencement of painting.
- Prior to application of final coat.

14.4 PAINTING

Substrate Preparation

Prepare new surfaces for painting in accordance with Section 3 of AS/NZS 2311.

For repainting of existing surfaces comply with Sections 7 and 8 of AS/NZS 2311. This includes cleaning down with sugar soap, treatment of mould growth, rubbing back existing painted surfaces with abrasive paper and patching and priming of damaged surfaces.

Order of work

Complete clear timber finishes before commencing opaque paint finishes in the same area.

Protection

Remove door furniture, switch plates, light fittings and other fixtures before starting to paint, and refix in position on completion of painting.

Restoration

Clean off marks, paint spots and stains progressively and restore damaged surfaces to their original condition. Touch up damaged decorative paintwork or misses with the paint batch used in the original application.

Fillers

Provide a filler tinted to match the substrate if the finish is transparent.

Paint application

Apply the first coat immediately after substrate preparation and before contamination of the substrate can occur. Ensure each coat of paint or clear finish is uniform in colour, gloss, thickness and texture, and free of runs, sags, blisters, or other discontinuities.

Number of coats

Apply additional coats if necessary at no extra cost to achieve the required total film thickness and satisfactory opacity.

Priming before fixing

Timber: Apply a first coat (two coats to end grain) to exposed roof trim, timber doors including tops and bottoms of doors, associated trims and glazing beads before fixing in position.

Steel: Apply a priming coat of zinc-rich organic binder to APAS - 2916.

Repair of galvanizing

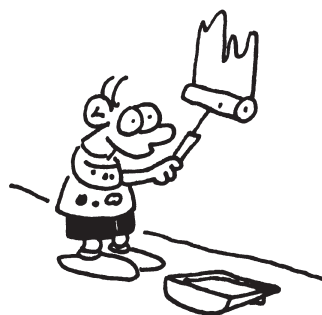
If galvanized or zinc-coated surfaces have been cut or welded after galvanizing, prime the affected area with a zinc-rich organic binder to APAS - 2916.

Paint system description

If a system is referred to only by its final coat (for example by the manufacturer's brand name, the APAS specification code or the generic name) provide stains, primers, sealers and undercoats which are suitable for the substrate and are compatible with the finish coat and each other.

Painting Schedule

Refer to the Project Specific Requirements for painting, where applicable.





15. FLOOR COVERINGS

15.1 GENERAL

Cross reference

Refer to the *Painting* section for finishing of sanded timber floors.

Approved Fixers

Have the floor coverings and accessories installed by experienced fixers approved by the floor covering supplier.

15.2 INSPECTION

Notice - Witness Point

Witness Point: Give sufficient notice so that inspection may be made of the prepared substrate or underlay.

15.3 MATERIALS AND COMPONENTS

Hardboard underlay

Standard: To AS/NZS 1859.4, standard hardboard Type RD, manufactured as flooring underlay.

Thickness: 5.5 mm.

Carpet underlay

Needled underfelt: Provide a felt composed of 60% animal fibre and 40% jute, reinforced with polypropylene scrim with a minimum mass of 50 g/m², or hessian fabric with a minimum mass of 150 g/m².

Synthetic Foam underlay: Provide a high density synthetic latex flat cushion foam sandwiched between reinforced carrier fabric.

Rubber underlay: Provide a heavy-duty natural rubber, waffle pattern, with a backing of reinforcing fabric, either hessian, spun nylon, or polyester.

Hot-melt adhesive tape

Provide a glass fibre and cotton thermoplastic adhesive coated tape 60 mm wide on a 90 mm wide metal foil base and backed with silicon-coated release paper.

15.4 SUBSTRATE

Substrate preparation

Prepare the substrate including the following:

- Stripping and cleaning: Remove deleterious and loose material, including existing floor coverings and any surface treatment which could adversely affect adhesion.
- Repairs: Make good to the surface finish as necessary. Fill depressions with a suitable filler, and remove high spots and projections. If necessary lay a steel-trowelled underlay to concrete substrate.
- Fixtures and fittings: Remove door stops and other fixtures, and refix in position undamaged on completion of the installation.
- Basic sanding: Produce an even plane sanded surface on strip flooring to be covered with

carpet or resilient sheet or tile. Lightly sand the junctions of sheet flooring.

Moisture Content

General: Do not commence the installation of flooring unless the moisture content of the concrete substrate has been tested to AS/NZS 2455.1, Appendix B and values obtained as follows:

- < 5.5% when tested by the electrical resistance test
- < 70% when tested by the hygrometer test.

If necessary provide artificial means for drying out the substrate before installation.

15.5 LAYING CARPET

Standard: To AS/NZS 2455.1.

Setting out

General: Lay the carpet in continuous lengths without cross joins in the body of the area. Make unavoidable cross joins at doorways under the closed door.

Joints in underlay: Ensure joints in underlay do not coincide with carpet joints. Do not carry underlay over carpet grippers or edge strips.

Seaming methods

Woven carpet: Machine or hand sew.

Tufted carpet: Provide hot-melt adhesive tapes.

Fixing

Gripper strip: Provide preformed gripper strip and tackless edge strip. Space fixings at 150 mm maximum centres.

Permanent stick method: Immediately after laying, and again one hour later, roll the carpet from the centre diagonally towards each edge using a 65 kg multi-wheeled roller. Do not roll foam-backed carpet.

Edge strip

Provide a proprietary aluminium edge strip with a PVC insert at exposed edges of the carpet. If edge strips occur at doorways, make the junction underneath the closed door.

Proprietary Item: Roberts multi-purpose aluminium trim section.

Clearance

Doors: Trim doors as required to clear the finished carpet by 3 mm and reseal the underside.

15.6 LAYING RESILIENT FINISHES

Standard: To AS 1884.

Sheet set out

Set out sheets to give the minimum number of joints. Run sheet joints parallel with the long sides of floor areas.

Tile set out

Set out tiles from the centre of the area. Match



edges and align patterns. Arrange the material so that variation in appearance is minimised.

Adhesives

Use adhesives as recommended by the manufacturer for the particular application.

Joints

Heat welding: After fixing, groove the seams with a grooving tool and weld the joints with matching filler rod and hot air welding gun. When the weld rod has cooled, trim off flush.

Cold welding: Apply seaming compound 100 mm wide to the substrate centrally under the seam. Roll the finish in two directions until the compound is forced up into the joint. Clean off flush with a damp cloth.

Junctions

Scribe neatly up to returns, edges, fixtures and fittings. Finish flush with adjoining surfaces.

Vinyl Skirting

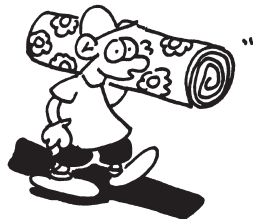
Moulded black PVC feather edge skirting section, 100 mm high. Scribe as necessary, mitre corners and fix to walls with contact adhesive.

Cleaning and protection

Keep traffic off floors until bonding has set or for 24 hours after laying, whichever period is the longer. Do not allow water in contact with the finish for 7 days.

Finishing

Finish in accordance with the manufacturers written instructions.



16. PLUMBING AND DRAINAGE

16.1 GENERAL

Cross references

Refer to the following sections:

- *Site preparation*, for service trenches.
- *Roofing*, for roof plumbing.
- *Tiling*, for waterproofing of wet areas.
- *Painting*, for priming steel or iron before installation and exposed piping required to be painted.

Standards

Plumbing and drainage products: To SAA MP52.

Installation: To AS/NZS 3500.5.

16.2 NOTICE

Commencement – Hold Point

Hold Point: Do not commence work until a Copy

of the approved plumbing plans has been lodged with the Building Certifier. Supply one copy of the approved Drawings to the Superintendent before commencing work on site.

16.3 INSPECTION

Notice: Give sufficient notice so that inspection may be made of work ready for testing. Include inspection for, plumbing, drainage and gas instructions.

16.4 TESTS

Hydrostatic tests – Hold Point

Hold Point: Waterpipes: Test to AS/NZS 3500.1, Section 16.

Hold Point: Sanitary Pipes: test to AS/NZS 3500.2, Section 13.

Preparation for testing

Seal off items of equipment not designed to withstand the test pressure. Securely anchor pipes and fittings in position to prevent movement during the tests.

Cure solvent cement joins for at least 24 hours before testing.

Testing

Check pipe joints, valve seats, tap washers, strainers and other elements for leaks. Repair or replace if damaged, and retest.

16.5 CONTRACTOR'S SUBMISSIONS

Work-as-executed drawings

Submit drawings showing the 'as installed' locations of pipes, fittings, tanks, water heaters, control valves and accessories. Show the depth of underground pipework.

Connections

Excavate to locate and expose the connection points and connect to the authorities' mains. On completion, backfill and compact the excavation and reinstate surfaces and elements which have been disturbed such as roads, pavements, kerbs, footpaths and nature strips.

Local authorities

If the authority elects to perform or supply part of the works, make arrangements and pay and bear the fees payable for the work.

16.6 MATERIALS AND COMPONENTS

Water supply pipes

Copper pipe: To AS 1432, Type B.

Joining methods: Use capillary fittings, compression fittings, silver brazed slip joints or screwed joints.

Galvanized steel pipe: To AS 1074, with screwed joints.

Wall thickness: Heavy for sizes up to and including DN 80, medium for sizes above DN 80.

Generally: Use copper pipes.



Corrosive water areas: Use class 16 Polybutylene pipes to AS/NZS 2642.2 and where exposed, use 316 stainless steel pipes.

Finishes

Finish exposed piping, including fittings and supports as follows:

- Internal locations such as toilet and kitchen areas: Bright chrome plate.
- Externally: Paint.
- Concealed but accessible spaces (including cupboards and non-habitable enclosed spaces): Leave unpainted except for required identification marking. Prime steel piping and iron fittings.

Valves

Finish valves to match connected piping.

Tapware and Fixtures

Provide sanitary fixtures and tapware as scheduled or shown on the drawings.

Toilet Cisterns

Provide toilet cisterns complying with a minimum 4A water efficiency rating.

16.7 CONSTRUCTION GENERALLY

General

Install piping in straight lines and to uniform grades. Arrange and support the piping so that it remains free from vibration and water hammer, whilst permitting thermal movement. Keep the number of joints to a minimum. Prevent direct contact between incompatible metals.

Concealment

If practicable, conceal piping and fittings requiring maintenance or servicing so that they are accessible within non-habitable enclosed spaces such as roof spaces, subfloor spaces and ducts. Keep pipeline in subfloor spaces at least 150 mm above ground and ensure access can be provided throughout for inspection. Provide at least 25 mm clearance between adjacent pipelines (measured from the piping insulation where applicable).

Embedded pipes: Do not embed pipes that operate under pressure in concrete or surfacing material.

Building penetrations

If piping passes through building elements provide purpose-made metal or plastic sleeves formed from pipe sections. Prime steel or iron before installation.

Pipe supports

Materials: The same as the piping, or galvanized or non-ferrous metals, with bonded PVC or glass fibre woven tape sleeves where needed to separate dissimilar metals.

Cover plates

Where exposed piping emerges from wall, floor or ceiling finishes, provide cover plates of non-ferrous metal, finished to match the piping, or of stainless steel.

Connections to Network Utility Operator Mains

General: Excavate to locate and expose the connection points and connect to the Network Utility Operator mains. On completion, backfill and compact the excavation and reinstate surfaces and elements which have been disturbed such as roads, pavements, kerbs, footpaths and nature strips.

16.8 STORMWATER

Standard

General: To AS/NZS 3500.3 or AS/NZS 3500.5.

Cleaning

During construction, use temporary covers to openings and keep the system free of debris. On completion, flush the system using water and leave it clean.

Pipelaying

Lay pipelines with the spigot ends in the direction of flow.

Downpipe connections

Turn up drain branch pipelines to finish 50 mm above finished ground or pavement level.

Subsoil drains

Connection: Connect subsoil drains to the stormwater drainage system.

Trench width: Minimum 450 mm.

Subsoil drains: Provide proprietary perforated plastic pipe.

Filter fabric: Provide a non woven polymeric fabric formed from a plastic yarn containing stabilisers or inhibitors to make the filaments resistant to deterioration due to ultraviolet light.

Filter sock: Provide a non woven polyester permeable sock capable of retaining particles of 0.25 mm size. Securely fit or join the sock at each joint.

Backfilling: Backfill with 20 mm nominal size washed screenings, to the following depths:

- To the underside of the bases of overlying structures such as pavements, slabs and channels.
- To within 75 mm of the finished surface of unpaved or landscaped areas.

Stormwater Pits

Cover levels: Locate the top of covers or gratings, including frames as follows:

- In paved areas: Flush with the paving surface.
- In landscaped areas: 25 mm above finished surface.
- Gratings taking surface water runoff: Set to receive the runoff without ponding.



16.9 WASTEWATER

General

Standard To AS/NZS 3500.2 or AS/NZS 3500.5.

Materials: UPVC drainage pipes, type DWV.

Waterless composting toilets: To AS/NZS 1546.2

On site domestic wastewater treatment units: To AS/NZS 1546.3.

Cleaning

During construction, use temporary covers to openings and keep the system free of debris. On completion, flush the system using water and leave it clean.

Septic tanks

Precast concrete or glass fibre reinforced plastic septic tank: To AS/NZS 1546.1.

Effluent disposal: To AS/NZS 1547 and the requirements of the Environmental Health Branch of the Department of Health and Community Services.

Vent pipes

Staying to roof: Do not penetrate the roof covering, fix the stays at roofing screws.

Terminations: Provide bird-proof vent cowls made of the same material and colour as the vent pipe.

16.10 FRESH WATER

Standards

General: To AS/NZS 3500.1 and AS/NZS 3500.5.

Tap positions

Locate hot tap to the left of, or above, the cold water tap.

Accessories

Provide the accessories and fittings necessary for the proper functioning of the plumbing systems, including taps, valves, outlets, pressure and temperature control devices, strainers, gauges and pumps.

Water Heaters

Electric water heaters: To AS/NZS 4692.1

Minimum energy performance: To AS/NZS 4692.2

Gas hot water heaters: To AS 4552

Oil fired heaters: To AS 1691.

Solid fuel heaters: To AS/NZS 2918.

Heater installation

Location: Locate water heaters where they can be maintained or replaced without damaging adjacent structures, fixtures or finishes.

Solar water heater

Design and construction: To AS 2712.

Use a proprietary automatic water heater comprising solar collector and storage container, with supplementary heating unit, including the connections, controls and fittings necessary for the proper functioning of the system.

Manufacturer: Solahart 302L with 4 m² solar collectors for houses and 180L with 2 m² solar collectors for units. Use D models in corrosive water areas.

Electric Water Heater

Provide an electric water heater wall mounted in the position shown on the drawings or as directed.

Proprietary Item: Hardies Dux 50 litre. Model HDE50V.

Temperature

Maximum temperature at ablution outlets: 50°C.

Maximum temperature at kitchen sinks and laundry tubs: 60°C

Isolating valves

Provide isolation valves to water heaters.

Cleaning

On completion, flush the pipelines using water and leave them clean.

Rainwater Tanks

Standards

Metal tanks and rainwater goods: To AS/NZS 2179.1

Design and Installation: To the recommendations of SAA HB 230.

Polyethylene Tanks: AS/NZS 4766.

16.11 FIRE HOSE REELS

Standard: To AS/NZS 1221.

Reel Type: Reel drum mounting bracket, independent of the supply pipe.

Hose: 36 m hose with metal nozzle for jet and spray.

Installation: To AS 2441. Provide swing out arms where necessary.

16.12 GAS

Standard

General: To AS 5601 and AS/NZS 1596.

Installation

Install pipework in straight lines and uniform grades. Keep the number of joints to a minimum. Prevent direct contact between incompatible metals. Conceal pipes where possible.

Accessories: Provide the accessories and fittings, necessary for the proper functioning of the gas system.

Buried pipes

Warning tape: During backfilling, lay plastic warning tape above and for the full length of buried gas pipes.

Type: Minimum 100 mm wide, with "GAS PIPE UNDER" marked continuously.

Certificate of appliance - Hold Point

Hold Point: Submit a certificate from the manufacturer stating that the appliance meets with AGA/ALPGA approval for operation with the type of gas to be used.

Gas bottles

Provide 2 x 45 kg gas cylinders with a manual change over valve. Locate where shown on the drawings or as directed on a concrete pad.

**Appliances**

Gas water heaters: To AS 4552.

Gas space heating appliances: To AS 4553.

Commissioning

On completion of installation and testing, turn on isolating and control valves and purge and charge the installation.

Compliance plate - Hold Point

Hold Point: Install a compliance plate and provide a certificate of approval prior to practical completion.

**17. ELECTRICAL INSTALLATIONS****17.1 GENERAL****Cross reference**

Refer to the *Site preparation* section for service trenches.

Standards

Electrical installations generally: To AS/NZS 3000 and SAA HB 301.

Domestic electrical installations: To AS 3006.

Selection of Cables: To AS/NZS 3008.1.1

Design: To SAA HB 301

Minimum energy performance standards:

To AS/NZS 4782.2 and AS/NZS 4783.2

Regulations

Comply with the following Regulations:

- PowerWater Regulations
- WorkSafe Requirements (O, H & S Regulations)
- The B.C.A.
- DPI, Safety and Technical Regulations
- The N.T. Electricity Reform Act.

Materials & Components

Luminaries: To AS/NZS 60598.1.

Circuit breakers: To AS 60947.2.

Low voltage switchgear and control gear: To AS 60947.1.

Switchboards: To AS 3439.1 or AS 3439.3 as appropriate.

Domestic electricity meter enclosures: To AS 6002 and PowerWater requirements.

Cables: To AS/NZS 3008.1.1.

17.2 INSPECTION**Notice - Witness Point**

Witness Point: Give sufficient notice so that inspection may be made of trench excavations and underground or concealed conduits or cables before covering.

17.3 INSTALLATION GENERALLY

Wiring: Conceal cables and conduits, including underground cable or conduit entering the building, in a manner that will allow wiring replacement without structural work or the removal of cladding or lining. Do not penetrate damp-proof courses.

Electrical accessories: Install flush mounted accessories in wall boxes, if required, in masonry and in mounting brackets in stud walls.

Fixed appliances: Provide connections with socket outlet and flush blank plate for fixed and stationary appliances.

17.4 CONSUMER MAINS & METERING

General: Provide a consumer main and connect to the main service.

Meter Box: Provide a metal meter box with a hinged lid and arrange for the Kwh meter to be installed by PowerWater.

Standard: To AS 6002 and PowerWater requirements.

17.5 DISTRIBUTION BOARD

General: Provide control switchgear, circuit breakers and residual current devices (RCD's) on a wall mounted distribution board enclosed in a case with a hinged door.

Housing: Install a distribution board with a minimum of 4 spare poles.

Circuit Breakers: DIN rail mounted. 6kA minimum fault current rating. Size circuit breakers to the calculated fault current at the site. Provide combined circuit breakers and residual current devices on each circuit requiring RCD protection.

Leave documents and instructions behind for use by the building occupiers on how to use the RCD's.

17.6 ACCESSORIES**Socket outlets and light switches**

Proprietary Item: Use Clipsal 2000 series or HPM Excel. For Public Housing or institutional buildings use single piece face plates and positively locked in switches.

Mounting heights

Light Switches and Fan Controllers: 1300 AFL.

Generally 1000 AFL if required for disabled access which must match the height of the door furniture.

Socket Outlets: Generally 300 above floor level or or 200 above bench surface.

Ceiling Fans

Mounting Height: 2300 mm minimum.

Fixing: fix to 75 x 50 hardwood trimers securely fixed between truss bottom chords. On sloping ceilings provide a hardwood mounting block to give a horizontal fixing.

Controls: 5 speed or electronic generally mounted adjacent to light switches and in view of the fan.



Smoke detection

Provide smoke detectors to the requirements of the BCA.

Standard: To AS 3786.

Power: Connect to the nearest light circuit or where the number of detectors is 4 or more connect to a dedicated final subcircuit.

Connection: Inter connect detectors so as to raise the alarm in all areas in the event of one detector being activated.

Installation: To AS 1670.6.

Emergency lighting

Provide emergency lighting and exit signs in accordance with the BCA and to AS 2293.1.

Intruder Alarm System

Provide an intruder alarm system.

Standard: To AS/NZS 2201.1.

17.7 APPLIANCES

Wiring: For permanently connected appliances, including appliances the provision of which is specified in other Sections, provide a standard wall box, if required, or a wall bracket in stud framed structures, with either a flush blank plate or isolating switch, angle take off terminator, and approximately 900 mm of flexible PVC conduit terminated at the appliance and supported in accessible locations.

17.8 TELECOMMUNICATIONS CABLING Standards

Generally: To the Australian Communications Authority-Communications Cabling Manual parts 1 and 2.

Cables: to AS/ACIF S008.

Cable installation: to AS/ACIF S009 and AS/ANZ ISO/IEC 15018.

Pre Wiring: Have pre-wiring of telephone, data, TV and tele-communications services carried out before the installation of linings, paving and landscaping.

Telephones in dwellings

Wire and terminate telephone outlet to a standard ACA box on external wall. Liaise with the service provider for location of termination box. Arrange with the service provider for the installation of the incoming service line, cabling etc., as supplied by the service provider.

17.9 TELEVISION

Provide an analogue and digital television distribution system to AS/NZS 1367 and conforming to the recommendations of Digital Broadcasting Australia.

Antennas: Provide and locate antennas to receive all locally available free-to-air television stations suitable for satellite or cable network operators services. Provide a coaxial cabling system.

Conduits for future cabling: > 25 mm diameter with drawstrings.

Outlets: Connect the TV antennae to outlet plates where shown on the drawings.

Testing - Witness Point

Witness Point: Test the complete television and audio system and provide the superintendent with a certificate showing test results and certifying compliance.

17.10 COMMISSIONING

Requirement: On completion clean faceplates, luminaire reflectors and diffusers, and the like, replace faulty lamps, reinstate ground surfaces and finishes disturbed by trenching, and hand over the completed installation in working order.

Testing: Carry out mandatory inspection and testing in accordance with AS/NZS 3000, Section 6.

Contractor's Submissions: Prior to practical completion submit the Electrical Certificate of Compliance to the Superintendent.

**18. MECHANICAL INSTALLATIONS****18.1 GENERAL****Cross references**

Refer to the following sections:

- *General requirements:* for compliance with manufacturers instructions.
- *Electrical installations:* For electrical requirements.

Standards

Non ducted air conditioners: To AS/NZS 3823.1.1.

Ducted air conditioners: To AS/NZS 3823.1.2.

Evaporative air coolers: To AS 2913.

18.2 AIR CONDITIONERS

Efficiency Rating: Minimum 4 Star Rating

Split Systems - Installation

Refrigerant Lines: Use pre-charged lines and equipment or if field installed test for dryness.

Refrigerant Type: Use only R22, or R410A or R407.

Leakage Testing: Comply with AS/NZS 1677.2 and the recommendations of SAA HB 40.1 and SAA HB 40.2



Dryness testing: Test each refrigerant system for dryness by evacuating the whole system when the ambient temperature is over 16°C to maximum 25 Pa absolute pressure and measuring the pressure rise with the vacuum pump isolated from the system. Maximum allowable absolute pressure rise after minimum 4 hours is 15 Pa.

18.3 INSTALLATION GENERALLY

Installation: Bolt units down to manufacturer's recommendations using anti vibration mounts. Install refrigeration piping and electrical wiring neatly. Provide colorbond steel covers over exposed pipework.

Clearance: Provide minimum recommended clearance around units for correct condenser air flow and maintenance requirements.

Insulation: Protect pipework insulation against ultra-violet light and mechanical damage by fitting folded colorbond metal covers.

Cyclone Fixings: Fix all external plant to resist cyclonic winds in accordance with the N.T. Building Act.

Electrical: Hardwire split systems from isolating switches adjacent to the outdoor units, with control wiring to the indoor units.

18.4 CONDENSATE DRAINS

Install condensate drains in accordance with the N.T. Plumbing code, AS/NZS 1477, AS 2032 and AS/NZS 3666.1.

Minimum size: 20 mm. Connect to the nearest floor waste, stormwater drain or to a soaker drain.

Insulate drains within the building envelope.

Soakage Pit: 50 Dia uPVC pipe 2 m long with 2 m of slotted uPVC pipe at end graded away from building in 600 deep trench. Surround slotted pipe with 100 mm cover of 13 mm aggregate.

Drawing: Refer to detail 2 on standard housing drawing B08 - 7278.

18.5 FRESH AIR

Provide fresh air supply through the air conditioning unit to air conditioned spaces in accordance with AS 1668.2.

18.6 DUCTWORK

Requirement: Provide ductwork for fresh air supply or exhaust air as required.

Standard: To AS 4254.

Material: Zinc coated steel sheet to AS 1397/G2 Z275.

Provide suitable grilles at intakes and outlets.

Filters: Provide filters for fresh air supply to AS 1324.1 G2, Type 1, Class A.

Circular Flexible Ductwork

Fabrication: To AS 4254 clause 2.8 using reinforced foil laminate to fire rating 4.0.0.0.

Installation: Fix without restriction to airflow using straps to prevent sagging.

18.7 FANS

General

Provide fans which have quiet operation, deliver the required air quantity against the resistance of the system as installed and have maximum static efficiency at the required duty.

Installation: Install fans so as to isolate vibration and to allow access for maintenance.

18.8 COMMISSIONING

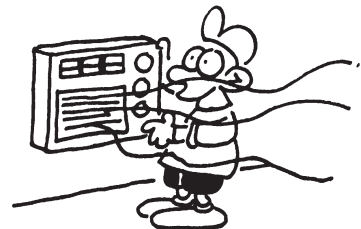
Test, commission and maintain the specified mechanical services, including all inferred and obvious work required to complete the works.

18.9 CORRECTIVE MAINTENANCE

Commence any corrective maintenance within 4 hours of verbal advice from the Superintendent during the defects liability period. Report on the progress and advise the Superintendent if any delays are foreseen.

18.10 SERVICING

During the defects liability period, provide servicing to mechanical units in accordance with the manufacturer's instructions.



19. FENCES

19.1 GENERAL

Cross reference

Refer to the following sections:

- *Block Construction* for block fences and walls.
- *Paving* for Log Barriers.

19.2 MATERIALS AND COMPONENTS

Galvanizing

Galvanize mild steel components as follows:

- Threaded fasteners: To AS 1214.
- Other components: To AS/NZS 4680.

Steel Tubes

Standard: To AS 1163 grade C350LO or to AS 1074.



Wire

Chainwire, cablewire, tiewire or barbed wire: To AS 2423.

Concrete

Standard: To AS 1379 Grade N25.

Metal Components

Self-drilling screws: To AS 3566 corrosion resistant class 3.

Steel framing: Zinc-coated or aluminium/zinc alloy coated steel to AS 1397/Z450 or AZ150.

Steel sheeting: Prepainted to AS/NZS 2728.

19.3 CONSTRUCTION GENERALLY**Clearing**

Clear vegetation except for trees and shrubs to be retained within 1 m of the fence alignment. Grub out the stumps and roots of removed trees or shrubs and trim the grass to ground level, but do not remove the topsoil.

Setout

Setout the fence lines and mark the positions of gates, posts and bracing panels.

Excavation

Excavate footings so that they have vertical sides and a firm base.

Minimum footing size

Refer to the standard drawing for the required fence.

Line and level

Erect posts vertically to follow the contours of the natural ground.

Concrete footings

Place mass concrete around posts and finish with a weathered top falling 25 mm from the post to ground level.

Steel panel fencing

Ensure bottom rails have drain holes and are at least 50 mm clear of the ground or mowing strip.

Mowing strips

Where required provide a 200 x 75 mm deep concrete mowing strip under the centreline of the fence to finish 20 mm above finished ground level.

19.4 GATES**General**

Construction: Construct gates to match the fencing and in the locations shown on drawings or as directed.

Hardware: Provide the following:

- Drop bolt and ferrule to each leaf of double gates.
- Latch to one leaf of double gates.
- Provision for locking by padlock.
- Hinges to ensure smooth operation.

Hand access: Provide hand holes to give access from outside to reach locking provision.

19.5 FENCE TYPES**Domestic fences**

Street Frontage: 760 mm high galvanized posts and rails with chainwire in accordance with standard drawing CS 1304-2.

Other Boundaries: 760 mm high galvanized posts and pigwire in accordance with standard drawing CS 1304-2.

Security fences

1830 mm high chainwire supported on 4 mm galvanized wire cables and posts, complete with offset 3 strand barbed wire at the top constructed and installed in accordance with standard drawing CS 1303-1.

Remote Community Fences

1500 mm high chainwire with knuckled selvages supported on 3 strands of 2 x 4 mm galvanized twisted wire and galvanized steel posts set in concrete footings in accordance with standard drawing B93-1168-D.

Swimming pool fences

Standard panels of 16 dia tube roll top fencing 2400 long x 1250 high welded to 32 x 32 x 1.6 rails and fixed with proprietary fittings to 65 x 65 x 2.5 mm SHS posts, including caps. Gate posts 76 x 76 x 3.2 mm SHS.

Concrete Footings: 250 dia x 600 deep for posts and 300 dia x 700 deep for gateposts.

Finish: Hot dipped galvanized and powder coated.

Fit proprietary hinges and safety latches etc.

Proprietary Item: Magnalatch.

Horizontal sheet metal fences

Hot dipped galvanized 65 x 65 x 3 SHS posts with caps at 2400 centres set in 225 dia x 900 deep concrete footings with 0.42 mm BMT Colorbond Trimdek in long lengths, valley fixed horizontally to finish 1600 above ground level in accordance with standard drawing B93-1168-D.

Vertical sheet metal fences

Hot dipped galvanized 76 x 76 x 3.2 SHS posts, 1500 high with caps, at 2400 crs set in 250 dia x 600 mm deep concrete footings with 64 x 38 x 3.2 mm RHS horizontal rails clad with 0.42 mm BMT Colorbond Trimdek valley fixed vertically to finish 1650 above ground level.

Refer to the Northern Territory Deemed to Comply detail S8.



20. PAVING

20.1 GENERAL

Cross reference

Refer to the Site Preparation section for fill types.

Footpath crossing

Provide a footpath and kerb crossing to local council requirements.

20.2 MATERIALS AND COMPONENTS

Mortar materials

Sand: Use a fine aggregate with a low clay content selected for grading.

Cement: To AS 3972, type GP.

Mortar

Mix proportions: 1:3 cement: sand.

20.3 CONSTRUCTION GENERALLY

Grading

General: Grade paving to even falls to drain away from buildings to drainage outlets without ponding. Minimum fall for drainage: 1:100.

20.4 BASE COURSE

Preparation

Prepare the subgrade to suit the thickness of the base course and paving. If necessary, loosen the ground to a depth of 200 mm and adjust the moisture content before compaction. Compact the ground to a firm even surface using at least 2 passes of a vibrating plate compactor or roller. Remove and replace soft areas with suitable fill.

Base course material

Provide well-graded crushed rock or gravel, free of deleterious material, with a maximum particle size of 26.5 mm, uniformly graded and with a maximum clay content of 6% by mass.

Placing

Spread and compact the base course to a firm, tight, close textured surface using at least 3 passes of a vibrating plate compactor or roller. Adjust the moisture content as needed to facilitate compaction.

Base course minimum thickness table

Comply with the following minimum thicknesses:

	Site classification to AS 2870			
	Unit paving		Bituminous paving	
	A	S&M	A	S&M
Foot and bicycle traffic	0	0	50 mm	100 mm
Light domestic traffic occasionally up to 3 tonne gross	0	75 mm	100 mm	150 mm

20.5 ASPHALT PAVING

Hotmix paving

Standard: Place and compact asphaltic concrete paving over the prepared base course to AS 2150.

Mix designation: AC7.

Bitumen binder: Class 320 bitumen.

Minimum thickness: 25 mm.

Tack coating: Bitumenous emulsion spray to AS 2150.

20.6 SPRAY SEALING

Preparation

Prepare the surface as per the Gravel Driveways clause.

Priming: Prime the surface with cutback bitumen to AMC 00 at the rate of 1 litre per m².

Sealing

Apply the bitumen seal at the rate of 2.5 litres per m².

Mix Designation: S10E.

Aggregate: Apply 14 mm aggregate and roll into the surface.

Completion

Broom off the excess aggregate and remove from site.

20.7 UNIT PAVING

Masonry segmental pavers

General: Provide paving units of clay, natural stone or concrete masonry, purpose-made for use as paving, or units made for bonded masonry construction but suitable for paving.

Standard: To AS/NZS 4455.1 and AS/NZS 4455.3.

Minimum thickness:

- Foot and bicycle traffic: 40 mm.
- Light domestic traffic occasionally up to 3 tonne gross: 60 mm.

Cutting units: Cut paving units to maintain sharp edges and accurate joints and margins.

Pattern: As shown on the drawings otherwise stretcher bond.

Laying unit paving

General: Over the base course, lay the units on bedding sand screeded to a uniform thickness not exceeding 50 mm, and to the required falls and levels. Do not disturb the screeded sand bedding before the units are laid. Provide a gap of 1-3 mm wide between adjoining units. After laying, tamp the units using a vibrating plate compactor.

Dry joints: Fill the joints flush with clean, fine sand or screened bedding sand passing a 1.2 mm sieve, vibrate into the joints and then make 2 further passes of the vibrating plate compactor.

Edge restraint

Provide concrete fillet edge restraint where needed to support the sand bedding and maintain the paving shape.

20.8 IN SITU CONCRETE PAVING

Concrete

Standard: To AS 1379 grade N25.

Minimum thickness

Foot and bicycle traffic and light domestic traffic occasionally up to 3 tonne gross: 100 mm.

Reinforcing Mesh: SL62 placed centrally.

Preparation

Trim the ground to suit the required thickness of concrete and compact to a firm, even surface.

Control joints

Form tooled joints at maximum 2 m spacing.

Expansion joints

Cast-in 10 mm thick Ableflex closed cell compressible filler strip at maximum 6 m spacing.

Abutment with building

If concrete paving more than 1.5m wide abuts the wall of a building, provide a strip of 10 mm thick Ableflex closed cell compressible filler strip between the paving and the wall.

Broom finish

Wood float and broom to an even textured slip-resistant surface with steel tooled margins. On gradients steeper than 10%, roughen the surface by scoring.

Exposed aggregate finish

Steel trowel to a smooth surface. After final set use clean water and brushes to remove the surface film of mortar until the aggregate is uniformly exposed without cutting of the matrix.

Sponge finish

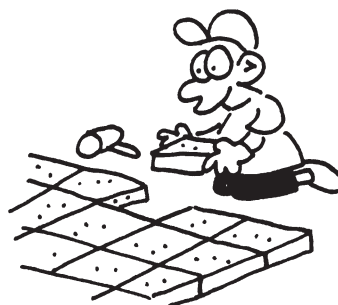
After screeding and finishing with a steel trowel obtain an even textured sand finish by wiping the surface using a damp sponge.

Pattern Paving

After machine floating, apply a proprietary treatment producing an integral coloured and patterned surface.

Use pine timber, pressure impregnated with ACQ preservative formulation, copper oxide (CuO) and quaternary ammonium compound (DDAC) to Category H4 of AS 1604.

Do not use preservative treatments that contain arsenic or chromium.



20.9 GRAVEL DRIVEWAYS

Location: Hardstand, driveways and paths as shown on the drawings.

Material: Approved road gravel - Type 3.

Thickness: Minimum 100 mm after compaction.

Falls: Minimum 1:100.

Compaction: Compact and Proof Roll to achieve a dry density ratio of 95% MMDD when tested to AS 1289 5.4.1.

20.10 LOG BARRIERS

Provide log barrier bollards or fencing consisting of timber posts and rails complete with connections. Construct as shown in the standard drawing C(S) 1302.1.

For bollards turn the tops to a hemispherical shape.



21. LANDSCAPE

21.1 GENERAL

Cross reference

Refer to the *General requirements* section for timber durability.

21.2 MATERIALS AND COMPONENTS

Concrete

Standard: To AS 1379.

Topsoil

Standard: To AS 4419.

21.3 PREPARATION

Weed eradication

Eradicate weeds using a non-residual glyphosate herbicide in any registered formulae, at the recommended maximum rate.

Surplus spoil

Remove surplus spoil from site. Do not burn vegetative material.

21.4 INSPECTION

Notice - Witness Point

Witness Point: Give sufficient notice so that inspection may be made of the planting and garden edging setout prior to excavation and advanced tree and palm holes excavated.

21.5 SAMPLES

Requirement - Hold Point

Hold Point: Provide the following samples for approval:

- 5 kg bag of topsoil and test documentation.
- 5 kg bag of mulch.

21.6 SUBSOIL

Ripping

General: If practicable rip parallel to the final contours. Do not rip when the subsoil is wet or plastic. Do not rip within the dripline of trees to be retained.

Ripping depths: Rip the subsoil to the following typical depths:

- Compacted subsoil: 300 mm.
- Heavily compacted clay subsoil: 450 mm.

Cultivation

Cultivate to a minimum depth of 100 mm. Do not disturb services or tree roots; if necessary, cultivate these areas by hand. During cultivation, thoroughly mix in materials required to be incorporated into the subsoil. Remove stones exceeding 25 mm, clods of earth exceeding 50 mm, and weeds, rubbish or other deleterious material brought to the surface during cultivation. Trim the surface to the required design levels after cultivation.

Additives

General: Apply additives after ripping or cultivation and incorporate into the upper 100 mm layer of the subsoil.

Gypsum: Incorporate at the rate of 0.25 kg/m².

21.7 TOPSOIL

General

Provide sand based topsoil which is free from unwanted matter and complying with AS 4419. Add 6 kg/m³ of "Terra Firma Organic Life" and thoroughly combine.

Source

Obtain topsoil from an approved source and keep records of soil delivery.

Placing topsoil

Spread the topsoil on the prepared subsoil and grade evenly, making the necessary allowances so that required finished levels and contours are achieved after light compaction; and grassed areas may be finished 20 mm below adjacent hard surfaces such as kerbs, paths and mowing strips.

Consolidation

Compact lightly and uniformly in 150 mm layers. Avoid differential subsidence and excess compaction and produce a finished topsoil surface which is finished to design levels; smooth and free from stones or lumps of soil; graded to drain freely, without ponding, to catchment points; graded evenly into adjoining ground surfaces; and ready for planting.

Topsoil depths

Spread topsoil to the following typical depths:

- Planting areas: 250 mm.
- Irrigated grassed areas generally: 150 mm.
- Grass areas: 100 mm.

21.8 TURFING

Turf

Obtain turf from a specialist grower of cultivated turf. Provide turf of even thickness, free from weeds and other foreign matter.

Supply

Deliver the turf within 24 hours of cutting, and lay it within 36 hours of cutting. Prevent it from drying out between cutting and laying.

Fertilising

Mix fertiliser thoroughly into the topsoil before placing the turf.

Laying

Lay turf as follows:

- In "stretcher" pattern with the joints staggered and close butted;
- Parallel with the long sides of level areas, and with contours on slopes and;



- To finish flush, after tamping, with adjacent finished surfaces of ground, paving edging, or grass seeded areas.

Tamping

Lightly tamp to an even surface immediately after laying. Do not use a roller.

Watering

Water immediately after laying until the topsoil is moistened to its full depth.

21.9 GRASS SEEDING**Seed**

Use seed mixtures which are thoroughly pre-mixed with a bulking material such as safflower meal. Deliver to the site in bags marked to show weight, seed species and supplier's name. Use fresh, clean new seed. Do not use wet, mouldy, or otherwise impaired seed.

Preparation

Prepare the areas to be sown. Spread the fertiliser evenly over the cultivated bed not more than 48 hours before sowing, and rake lightly into the surface. If a prepared area becomes compacted from any cause before sowing can begin, rework the ground surface before sowing.

Sowing

Sow the seed only in favourable conditions and using a suitable mechanical spreader. Roll the seed bed immediately after sowing.

Watering

Water the seeded area with a fine spray until the topsoil is moistened to its full depth. Continue watering until germination to keep the surface damp and the topsoil moist but not waterlogged.

After germination: Water to maintain a healthy condition, progressively hardened off to the natural climatic conditions. Remove weeds that occur in sown areas.

Germination

A dense continuous sward of healthy grass over the whole of the seeded area. Reseed areas that do not germinate within 1 month.

21.10 SPRAYGRASS (Hydroseeding)**Preparation**

Cultivate insitu soil to a minimum of 100mm and bring existing soil to a fine tilth 50mm below finished levels. Remove all deleterious material. Add "Tropigro-Clay-Breaker" to manufacturers specifications. Spread 50mm topsoil and incorporate additional "Terra Firma Organic Life" at 6kg/m³.

Application

Apply seed at 10g/m² using:

- 30% Cynodon dactylon
- 35% Paspalum notatum pensicola
- 35% Paspalum notatum argentina

Apply to the area to be seeded a thoroughly mixed slurry of seed, fertiliser, vegetative emulsion, mulch and water, free of weed, seed or germination inhibitors, using a purpose made mechanical mixer and high pressure pumping equipment. Use local applicators experienced in this work and using approved methods.

21.11 Mowing

Mow to maintain the grass height within the required range of 40 to 80 mm. Carry out the last mowing not more than seven days before the end the planting establishment period. Remove grass clippings from the site after each mowing.

21.12 PLANTING**Excavation**

Excavate plant holes a minimum of twice the size of the volume of the specified pot size.

Plants

General: Provide plants with the following characteristics:

- Large healthy root systems, with no evidence of root curl, restriction or damage;
- Vigorous, well established, free from disease and pests, of good form consistent with the species or variety and;
- Hardened off, not soft or forced, and suitable for planting in the natural climatic conditions prevailing at the site.

Trees: Provide trees which, unless required to be multi-stemmed, have a single leading shoot.

Labelling

Label at least one plant of each species or variety in a batch using a durable, readable tag.

Planting conditions

Carry out planting on the same day that plants are delivered to the site.

Do not plant in unsuitable weather conditions such as extreme heat, cold, wind or rain. In other than sandy soils, suspend excavation when the soil is wet, or during frost periods.

Backfilling

Backfill planting holes with imported blended topsoil.

Watering

Thoroughly water plants before planting and immediately after planting.

Fertiliser

Provide proprietary materials, delivered to site in sealed bags marked to show manufacturer or vendor, weight, fertiliser type, N:P:K ratio, recommended uses and application rates.

**Initial fertiliser at planting or sowing**

Location	N:P:K Ratio	Application Rate	Product
Grassed areas	15.9-7-7	7.5 kg/100m ²	Mastergreen
All planted trees: equally spaced around root ball	20-10-10 and trace elements	Manufact. Recomm.	Monsoon Planting Tablets
All planted trees: under mulch	12.5-3.3-6.5	Manufact. Recomm.	Monsoon Planting and Feeding Mix
Ground cover and shrubs	13-5.6-10.8	100 gms/m ²	Osmocote Plus 8 - 9 months
All trees and palms in base of hole	300 gms each hole		DPM Nuetrog

Fertiliser during establishment period

Location & Time	N:P:K Ratio	Applic. Rate	Product equivalent
For Grassed Areas			
In Nov. or when directed	10.3-9-7+11(s)	7.5kgs/100 m ²	Tropigro 10-97
In March or when directed	34%N	4 kgs/100 m ²	Agran 34

For planting: Week 10 of the establishment period

All trees: under mulch	12.5-3.3-6.5	Manufact. Recomm.	Monsoon Planting & Feeding Mix
All trees: under mulch		Manufact. Recomm.	DPM Nuetrog
Ground Cover & shrubs	13-5.6-10.8	100 gms per m ²	Monsoon Planting & Feeding Mix
Ground cover & shrubs		100 gms per m ²	DPM Nuetrog

For Planting: Week 40 of the establishment period

All trees: under mulch	13-5.6-10.8	Manuf. Recomm.	Osmocote plus 8-9 months
All trees: under mulch		Manuf. Recomm.	DPM Nuetrog
Ground cover & shrubs		200 gms per m ²	DPM Nuetrog
Ground cover & shrubs	13-5.6-10.8	200 gms per m ²	Osmocote Plus 8-9 months

21.13 MULCHING**Mulch**

General: Provide mulch which is free of deleterious and extraneous matter such as stones, soil, weeds and sticks.

Application: Place mulch clear of plant stems, and rake to an even surface flush with the surrounding finished levels.

Depth: 75 mm.

Mulch Types

Hay: Cut from seasonal grasses and free from noxious weeds etc.

Laterite gravel: Uniform colour and size or graded from 5 to 25 mm.

Brush Chippings: Approved "Forest Blend" vegetative material processed to pieces not larger than 75 x 50 x 15 mm and aged from 6 to 12 weeks.

Washed River Pebble: Uniform size or graded from 10 to 25 mm.

21.14 STAKES AND TIES**Stakes**

Material: Hardwood, straight, free from knots or twists, pointed at one end.

Installation: Drive stakes into the ground at least one third of their length, avoiding damage to the root system. Remove those no longer required at the end of the establishment period.

Stake sizes:

- For plants 1 to 2.5 m high: Two 50 x 50 x 1800 mm stakes per plant.
- For plants smaller than 1 m high: One 38 x 38 x 1200 mm stake per plant.

Ties

General: Provide ties fixed securely to the stakes, one tie at half the height of the main stem, others as necessary to stabilise the plant. Attach ties loosely.

Webbing: Provide 50 mm hessian webbing stapled to the stake.

1.15 GARDEN EDGING**Spade Edging**

Location: To edges between garden beds and around tree planting in areas of lawn.

Requirement: Form a spade cut edge to a minimum depth of 150 mm below the adjacent surface levels. Align adjacent spade cuts to achieve smooth curves and/or straight lines as required. Remove all grass or weeds from the spade cut and maintain the edge free from grass and weed growth.

Concrete Edging

Location: To garden edges against lawns and areas not planted.

Edging Strip: N20 in situ concrete 175 mm wide x 90 mm high. Place in position on a cleared compacted base with a forming machine to the layout shown on the drawings or as directed.

Finish with a profiled steel trowel and tool in control joints at a maximum 2.5 m centres.

Profile: Rounded or splayed top.

21.16 IRRIGATION

Standard: To AS/NZS 3500.1.

Cross references

Refer to the following section:

- *Site preparation*: for excavating trenches.

Inspection - Witness Point

Witness Point: Give sufficient notice so that inspection may be made of work ready for testing.

Hydrostatic tests - Hold Point

Hold Point: Fill the pipework with water and test at the required pressure and duration.

Contractors design plans - Hold Point

Hold Point: Submit drawings indicating design proposals showing all pipework, sprinklers, tanks, valves and control systems for approval.

Work-as-executed drawings

Submit drawings showing the "as installed" locations of all pipework, fittings, sprinklers, control valves and accessories. Show the depth of underground pipework. Show location of all controllers and automatic control wiring, indicate colours used for individual valves.

Connection

Connect the cold water supply system to the supply authority's main through a stop valve and meter. Carry out the excavation necessary to locate and expose the connection point. On completion reinstate surfaces and elements which have been disturbed such as roads, pavements, kerbs, footpaths and nature strips.

Excavation and installation

Requirement: Excavate to the lines, levels and grades as required for irrigation trenches. Trench depths and widths as required by AS/NZS 3500.1.

Obstructions: Cut back roots encountered in trenches to not less than 600 mm clear of the pipework. Remove such other obstructions including stumps, boulders and the like which may, in the opinion of the Superintendent, interfere with the pipework.

Installation

Generally: Install pipework in straight lines and uniform grades. Provide unions, flanges and isolating valves for the satisfactory removal of piping and fittings for maintenance or replacement of plant. Arrange and support pipework so that it remains free from vibration whilst permitting necessary movements such as thermal expansion and contraction. Keep the number of joints to a minimum.

Accessibility

Location: Locate fittings requiring maintenance or servicing, including control valves, joints designed to enable removal of pipes, and the like, in accessible positions, with adequate clearance. Arrange the pipework so that it does not interfere with the removal or servicing of associated equipment or valves.

Description of irrigation system

Use a fixed location type with automatically or manually operated sprinklers, sprays, microsprays and drippers.

Performance of irrigation system

Coverage (mm of water over area to be watered): 50 to 60mm per week during the establishment period and then progressively hardening off to local conditions.

Ensure that final water usage is such that plant health and vigour is maintained without wastage of water.

Backflow

Fit a backflow prevention device to AS/NZS 3500.1 and as required to meet the approval of the PAWA.

Automatic controls

Use electric solenoid valves wired to an irrigation controller.

Irrigation controller: Mount the controller in a weatherproof lockable cabinet. Include the following features:

- Variable timer for each station with a range from 1 minute to not less than 30 minutes.
- Manual cycle and individual station operation.
- Manual on-off operation of irrigation without loss of program.
- 240 V input and 24 V output capable of operating 2 control valves simultaneously.
- 24 hour battery program backup.

Micro irrigation system

Polyethylene irrigation pipe: To AS 2698.1 Class IRRIG with barbed fittings of similar pressure rating fastened with ratchet type clamps. Lay pipe on finished ground surface under planting bed mulch and anchor at minimum 1.5 m intervals with U-shaped stakes. Connect micro-tube laterals with proprietary push in or screw in fittings.

Microsprays: Mount microsprays on stakes 300 mm above ground and connect to the pipework with microtubes.



Drippers: Use drippers which are turbulent flow types, easily dismantled for cleaning. Connect directly into the pipework or with microtubes.

Micro irrigation valve box: Use micro irrigation valve boxes which are of high impact plastic with snap lock covers at finished ground level, each housing a stop cock, filter (200 mm for microsprays, 100 mm for drippers), pressure reducing valve (170 kPa outlet pressure) and automatic control valve. Use vandal resistant controls in public areas.

Irrigation Schedule

Location	Item	Type	Requirement
At points shown on drawings	External hose cocks	Type	To AS/NZS 3500
		Size	20mm
As on approved design plan	Sprinkler	Type	Gear driven
As on approved design plan	Automatic valve	Type Size	Solenoid operated maximum pressure loss 20 kPa
As shown on drawings	Quick coupling	Type Size	Polypropylene 25mm valve
As required to achieve uniform coverage	Micro-sprays	Type	No moving parts
At each plant	Drippers	Type	Turbulent flow
At each plant	Bubblers	Type	Adjustable from 0 - 10 litres per minute

Materials:

Pipework upstream of control valves: Use uPVC class 12.

Pipework downstream of control valves: Use uPVC class 9 or 25 mm diameter polyethylene.

21.17 COMPLETION

Maintenance Manual

Provide a maintenance manual which includes notes and specifications of all landscape and irrigation work and recommendations for ongoing maintenance work.

Plant Establishment

Maintain the planted areas for a minimum of 13 weeks from the time of practical completion. Replace damaged, stolen or vandalised stock as required. For all other work including irrigation and hardworks, the contractual defects liability period applies.



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AS/NZS 1170.2	2002	Structural design actions - Wind actions.
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AS 1231	2000	Aluminium and aluminium alloys - Anodic oxidation coatings
AS 1288	2006	Glass in buildings - Selection and installation
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AS/NZS 1367	2007	Coaxial cable and optical fibre systems for the RF distribution of analog and digital television and sound signals in single and multiple dwelling installations
AS 1379	2007	Specification and supply of concrete
AS 1397	2001	Steel sheet and strip - Hot-dipped zinc-coated or aluminium/zinc-coated
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AS 1562.3	2006	Plastic
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SA HB 40.2	2001	The Australian refrigeration and airconditioning code of good practice - Reduction of emissions of fluorocarbons in residential airconditioning applications
SA HB 161	2005	Guide to plastering
SA HB 301	2001	Electrical installations - Designing to the wiring rules
AS/NZS		
ISO/IEC 15018	2005	Information technology - General cabling for homes

AUSTRALIAN PAINT APPROVAL SCHEME (APAS) SPECIFICATION NUMBERS

0014/1	One pack organic binder zinc rich pre-construction primer
0015/1	Full gloss alkyd enamel for interior and exterior use (buildings)
0015/3	Semi gloss interior enamel (buildings)
0016/1	Solvent borne undercoat for exterior and interior use (buildings)
0032	Metal primer – lead and chromate free (buildings)
0035/3	Two pack etch primer, chromate free
0114	One pack interior varnish (general purpose)
0115	Lightly pigmented solvent borne ranch finish for exterior timber
0117/4	Long life texture coating for exterior concrete and masonry - High build, high profile
0134	Latex primer for galvanised steel and zincalume (buildings)
0162/1	Zinc phosphate metal primer





REFERENCED DOCUMENTS

- 0163/1 Exterior latex undercoat (buildings)
- 0163/2 Interior latex undercoat (buildings)
- 0171 Solvent borne sealer for concrete and masonry (buildings)
- 0172 Latex sealer for wallboards (buildings)
- 0181 Solvent borne wood primer (buildings)
- 0200/1 One pack semi gloss pigmented solvent borne paving paint for concrete
- 0200/2 One pack full gloss pigmented solvent borne paving paint for concrete
- 0205 One pack clear moisture cured finish for timber
- 0206 Two pack clear finish for timber
- 0208 One pack clear solvent borne finish for concrete
- 0260/1 Interior gloss latex paint (buildings)
- 0260/2 Semi gloss interior latex paint in MCR (buildings)
- 0260/3 Low gloss interior latex paint in MCR (buildings)
- 0260/4 Washable flat finish for interior use (buildings)
- 0260/5 Ceiling paint – interior flat (buildings)
- 0280/1 Gloss exterior latex paint in MCR (buildings)
- 0280/2 Semi gloss latex paint, exterior (buildings)
- 0280/3 Flat or low gloss exterior latex finish in MCR (buildings)
- 0280/4 Heavily pigmented gloss latex ranch finish for exterior timber
- 0280/5 Heavily pigmented low gloss latex ranch finish for exterior timber
- 2908 Inorganic zinc coating for protection of steel
- 2916 Organic zinc rich coating for protection of steel
- 2971 Epoxy 2-pack durable primer for protection of steel in atmosphere
- 2972 Low build epoxy 2-pack coating for the long term protection of steel in atmosphere

NOTES

